is not surprising, and obviously it has increased access. Third-party payers have induced patients to use generics by having lower copays or by not putting the originator product on their formulary. Generic drugs have saved over a trillion dollars in health care costs between 2002 and 2011 (IMS, 2012). Biosimilar competition is also expected to result in substantial benefits.

Thus, there is a strange relationship between the originator and the generic (biosimilar) companies. The generic companies would not exist without the originators since there would be nothing to copy. However, the originators gain from the existence of generics since low-cost generics decrease the pharmaceutical budget costs of insurers and facilitate the ability of insurance companies to use these savings to pay for high-priced new drugs, especially biologics, thus encouraging innovation.

16.11 BARRIERS CONFRONTING BIOSIMILARS

H–W encouraged the development of generics by providing an abbreviated pathway, an ANDA, which required only chemical equivalency for generic approval. The BPCIA has done much the same for biologics that were not included in H–W. Before passage of BPCIA, there was no pathway for biosimilar competition. BPCIA gave the FDA power to develop guidelines for the entry of biosimilars and interchangeable biologics. The FDA approval process requires a stepwise approach, and the FDA will base its decision on a totality of evidence and a case-by-case approach. Among the factors that the FDA will examine are the structural and functional characteristics of the biosimilar and its reference product, animal data, human PK and PD data, clinical data on immunogenicity, safety, and efficacy (Christl, 2015). The FDA has four categories for the proposed biosimilar: not similar, similar, highly similar, and highly similar with finger-like similarity. The last two categories will constitute acceptance. Also, biosimilars can be of two types: biosimilar and interchangeable biologics. The latter must be achieved to be considered for automatic substitution. Biosimilar clinical trials are head-to-head trials with the reference product. Since biosimilars are not exact copies as are generics, whether to require clinical trials and their extent is a major issue. The FDA can waive the need for clinical trials, but this is not expected any time soon.

There are many barriers that make entry of biosimilars more difficult than generics. Biosimilars are much more costly to develop, and the process takes much longer than chemical generics. In particular, one estimate is that biosimilar development takes 8–10 years and involves costs in excess of $100 million compared to under $5 million and 3–5 years for generics (Ramachandra, 2014). The Federal Trade Commission (FTC) has similarly estimated that biosimilar development will cost between $100 million and $150 million and take 8–10 years versus $1–$5 million for a chemical generic (Blackstone and Fuhr, 2012).

In addition, there are likely to be other costs. For example, the cost of establishing a manufacturing facility has been estimated to be around $250 million (Blackstone and Fuhr, 2012). Another barrier making entry difficult and risky for biosimilars is their complexity, which makes expertise in their manufacturing quite important. Companies experienced in biological manufacturing like Amgen and Hospira will have a learning curve advantage that translates into a cost advantage (Blackstone and