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EDITORIAL

Improvements in Health Care

In efforts to contain costs of health care, all aspects of the complex system should be scrutinized. Obvious savings could be achieved in many facets. A reduction of punitive awards in malpractice suits would lead to a reduction in the number of costly defensive clinical tests and referrals. One potential objective that should be approached cautiously is cost reductions for pharmaceuticals. Expenditures for these constitute about 7 percent of funds devoted to health care. In contrast, pharmaceuticals have been responsible for about half of the improvement in health care that has occurred during this century. In this period, life expectancy increased from about 50 to 76 years, and extent of pain and suffering was reduced. In the future, life span may or may not be increased much more. But prospects are excellent that pain and suffering will be diminished and maladies attendant to aging will be ameliorated. Again, about 50 percent of improvements in health will be due to new drugs. Central to this expectation are the advances being made in genetics and molecular biology. These are providing means of identifying causes and mechanisms of diseases and clues as to how best to deal with them. Much of the relevant knowledge involves recombinant DNA, genes, and detailed information about functions and three-dimensional structures of proteins.

Biotechnology has created a new era in drug development. Earlier advances based on discovery of antibiotics were followed by a trial-and-error approach in which countless thousands of natural products and synthetic chemicals were tested. During that era, the easy-to-discover drugs were found. It is now more difficult than formerly to create a new pharmaceutical, but the knowledge base and experimental approaches have been vastly improved. A stream of new drugs based on biotechnology is now on, or approaching, the market. As many as 16 of these new pharmaceuticals have been approved by the Food and Drug Administration and more than 130 are undergoing clinical testing. Targets for further progress include cancer, Alzheimer's disease, cardiovascular disease, and AIDS.

Newly created biotechnology companies were pioneers in the present era of drug development. They have been particularly effective up to a point. They have mobilized highly trained teams that have worked long hours and imaginatively to identify new potential pharmaceuticals. They have been motivated by a desire to relieve human suffering. They have also hoped to reach the pot of gold at the end of the rainbow. That journey typically requires 12 years, the expenditure of large sums of money, and experiencing many triumphs and disappointments along the way.

On average the time course of research and development (R&D) for a drug includes $3\frac{1}{2}$ years for laboratory and animal studies, 1 year for phase one clinical safety studies, 2 years for phase two clinical effectiveness studies, 3 years for phase three extensive clinical testing, and $2\frac{1}{2}$ years for review by the Food and Drug Administration.

In the $3\frac{1}{2}$-year initial phase of drug development, costs were limited and the researchers often were content with small pay. Venture capitalists provided funds. But clinical trials are expensive, and phase three usually involves 1000 to 3000 patients. To meet the major costs requires large-scale financing. During the interval from July 1990 to July 1991, biotechnology companies received about $2.6 billion from external financing sources. Given a continuation of the present climate of price pressure on pharmaceutical companies, it is doubtful that adequate funds could be raised in the stock market or elsewhere. There now exists a substantial hazard of cessation of clinical tests, further demoralization of staffs of the biotechnology companies, and the disappearance of companies, some of them to be swallowed by the large traditional firms.

The major pharmaceutical companies have enjoyed a substantial period of prosperity and could withstand some trimming of their income. One estimate is that their profit margin is 13 percent. This translates into a profit of about $10 billion on sales of $76 billion. In 1992 the companies spent about $12.6 billion on R&D. If profit margins were reduced, the major firms would survive. They would probably respond to a smaller net profit as have those in other industries by chopping R&D. The major casualties of excessive price pressure on drugs would be the small biotechnology companies, the rate of development of new drugs to relieve human suffering, and global leadership of the United States in creating new pharmaceuticals.

Philip H. Abelson