The U.S. Health Care System as an Engine of Innovation

Innovation and new technology have changed the practice of medicine over the past few decades. Diagnostic tools such as magnetic resonance imaging and computed tomography scanning have made it possible for doctors to see otherwise invisible problems. Innovations such as balloon angioplasty treat conditions that previously required extensive surgery. Minimally invasive surgical techniques such as arthroscopy provide treatment options that lead to shorter hospital stays and faster recoveries. Restorative surgeries such as hip and knee replacements are now commonplace and provide patients with improved mobility and thus improved quality of life. New pharmaceuticals treat conditions that were previously intractable or help to avoid more costly surgeries and lengthy hospital stays. The list of advances is long and impressive.

The Value of Health Care Innovation

Innovation in health care goods and services, including advances in scientific knowledge that have changed many people's day-to-day behavior, has markedly improved the lives of Americans. Life expectancy at birth in the United States increased from 68.2 years in 1950 to 77.2 years in 2001. Medical advances have also increased the quality of life through innovations that improve mobility, sight, and hearing.

Some might argue that these advances are not unique to the United States and that Americans spend too much for health care relative to other countries. The United States expends a higher fraction of GDP on health care than does any other industrialized country. According to an international comparison released in 2003, the United States spent 13.9 percent of GDP on health care in 2001, while the average among industrialized countries was 8.4 percent of GDP. Measures of health outcomes such as longevity and infant mortality, however, are not markedly different in the United States than in other advanced economies that spend substantially less on health care.

The argument that the U.S. health care system is overly costly relative to other countries implicitly assumes that if two countries spend different amounts for health care and get the same health outcomes, then the higher-spending country must be inefficient and wasteful. This argument is not correct in the case of health care for two reasons that are related to the leading role of the United States as a source of research and innovation.

First, in general terms, while all countries can benefit from research and development expenditures made by a single country, only the health expenditures in the innovating country will include the costs of research and development. Health expenditures in non-innovating countries will exclude the research and development costs.

Second, free markets incorporate incentives for innovation that generate products, services, and knowledge that potentially benefit all countries. Markets naturally encourage and reward innovation. Unfettered by government price controls or access restrictions, innovative products, talented health care practitioners, and skilled health care professionals are rewarded in the marketplace. This leads to technological advances by encouraging talented people to participate in the health care industry and by increasing investment in new products and research. The financial rewards for innovation will be reflected in U.S. health expenditures through a combination of higher prices and wages, and higher usage than in other countries. Once a product or service is developed through the combination of talent and capital, however, it becomes available for use outside the United States. Countries in which government regulation has supplanted market forces will still have the opportunity to take advantage of U.S. innovation without having to pay as much for it.

As an illustration of how U.S. health expenditures reflect the incentives for innovation, consider products such as medical devices and pharmaceuticals. The patent system exists to encourage innovation for these types of products. The innovator's incentive in a patent-based system is the opportunity to hold a monopoly on a product for a limited period of time. Therefore, the innovator can temporarily charge a higher price and earn more profits than he would without patent protection. The higher consumer expenditures that can result from monopoly pricing will be reflected in health care expenditures.

Once the patent system has led to the development of a product, it is available for use throughout the world, not just in the United States. This leads to an opportunity for other countries with centralized health agencies to negotiate a price close to production costs, thereby paying lower prices than they would in a free market that fully respected patent rights. What this implies is that other countries can reap the benefits of U.S. innovations in health care goods and services but pay only a fraction of the costs. It follows that if the United States attempted to reduce health expenditures by adopting cost-control policies found in other countries, innovation would slow and both Americans and citizens of other countries would be affected.

U.S. Leadership in Health Care Technology

Several pieces of evidence point toward the preeminence of the United States in providing health care technology. First, since 1975, the Nobel Prize in medicine or physiology has been awarded to more Americans than to researchers in all other countries combined. Second, according to data collected through 1993, 15 of the 19 marketed "biotech" drugs used for nondiagnostic purposes were the product of U.S. companies alone. U.S. companies shared credit with companies from other countries for two more of the 19 drugs. As of 2002, eight of the world's ten top-selling drugs were produced by companies headquartered in the United States.

A third example of U.S. leadership is that many important medical innovations in the past 30 years arguably originated in the United States. This evidence is based on a survey designed to determine the relative importance of a variety of medical innovations developed over approximately the last 30 years. Starting with a review of the medical literature, researchers compiled a list of 30 major medical innovations and then surveyed over 300 leading general internists in the United States concerning the relative importance to their patients of the innovations. Based on the survey, researchers ranked the innovations in order of importance. The first and second columns of Table 10-1 reflect the results for the top ten innovations.

The table also includes countries of origin, a category that was not included in the original research. Assignment of country was based on the

TABLE 10-1.— *Important Medical Innovations and Associated Country of Origin*

Rank	Technology	Description	Country of Origin
1	Magnetic resonance imaging (MRI); Computed tomography (CT)	Noninvasive methods to view internal workings of the body	United States, United Kingdom; United States, United Kingdom
2	Angiotensin converting enzyme (ACE) inhibitors	Drugs to treat hypertension and heart failure	United States
3	Balloon angioplasty	Minimally invasive surgery to treat blocked arteries	Switzerland
4	Statins	Cholesterol-reducing drugs	United States, Japan
5	Mammography	Diagnostic tool to detect breast cancer	Indeterminate
6	Coronary artery bypass graft (CABG) surgery	Surgery for heart failure	United States
7	Proton pump inhibitors (PPIs); H2-receptor antagonists	Antiulcer drugs	Sweden; United States
8	Selective serotonin re-uptake inhibitors (SSRIs)	Antidepressant drugs	United States
9	Cataract extraction and lens implants	Eye surgery	United States
10	Hip replacement; Knee replacement	Joint replacement with mechanical prosthesis	United Kingdom; Japan, United Kingdom, United States

Sources: Victor R. Fuchs and Harold C. Sox Jr., "Physicians' Views of the Relative Importance of Thirty Medical Innovations," *Health Affairs*, September/October 2001. Descriptions and countries of origin from various sources.

location where the first clinically viable form of the innovation was developed or produced, or where research important to its creation occurred. The United States dominates this chart as the innovating country for these important medical developments. Of the ten, eight include the United States as a key country. The United Kingdom and Japan, the next closest sources, are associated with just two of the innovations each.

Table 10-1 should not be misinterpreted. Scientific advances by their nature are evolutionary, with recent advances building upon prior discoveries. The process of identifying a single person or team for progress that relies upon previous work is necessarily subjective. Nevertheless, such judgments are regularly made in selecting awards such as the Nobel Prize. But even taking into account the unavoidable limitations of such a list, it does suggest a dominant role for the United States in the development of new and useful medical technologies.

Box 10-1: Price Regulation and the Introduction of New Drugs

A recent study suggests that pharmaceutical firms tend to avoid or delay introducing new drugs in countries with price controls. In the study, which includes data from 25 countries on 85 new chemical entities introduced in the United States or the United Kingdom between 1994 and 1998, the three countries that did not require price approval before launch (the United States, Germany, and the United Kingdom) introduced the most new drugs. Analysis controlling for per capita income and other country and firm characteristics shows that countries with lower expected prices or smaller expected market size have fewer launches and longer launch delays. In the European Union, where drugs can be approved through a centralized procedure for use in the entire region, countries with price controls still experience significant launch delays.

According to the study, the connection between price controls and delayed access to drugs lies in the tendency for price controls to "spill over" from one country to another. Firms have an incentive to avoid or delay launching drugs in markets with price controls if they fear that the low prices will "spill over" to other markets. There are two main mechanisms by which price controls in one country can affect pharmaceutical profits in another: parallel trade and external referencing. With *parallel trade*, one country can take advantage of regulated low prices in another country through trade. With *external referencing*, countries can incorporate external price controls into domestic prices through price-setting formulas that depend on prices in other countries. Overall, the study suggests that there is a tradeoff between low prices and rapid access to new drugs.