

Case Study #9: The Artificial Heart: Cost, Risks, and Benefits

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INTRODUCTION

Current medical technology is often the result of a convergence of clinical research and practice with modern engineering. Advances in electronics, synthetic materials, pharmaceutical development, instrumentation, and computation result in important applications in diagnosis, therapy, and rehabilitation. The artificial heart program is an example of this convergence.

Cardiovascular diseases are still the leading cause of death in the United States. According to the National Center for Health Statistics, heart attacks and strokes—the most lethal and well-known manifestations of cardiovascular disease—claim over 700,000 victims each year. In an effort to prevent some of the deaths, the National Heart Advisory Council in 1963 recommended a long-range program of research to develop a permanently implantable artificial heart that could be used to replace a failing natural heart.

At the time, there was considerable optimism that the successful development of a permanently implantable artificial heart would provide a means of treating serious cardiac disease by two, well before biomedical advances were expected to produce appropriate preventive treatment (42). The success of cardiac pacemakers, hemodialysis, and prosthetic joint replacement underscored that optimism.

Today, after 15 years and over \$180 million in Federal expenditures, * however, a total implantable artificial heart is still a distant goal. This case study, discusses the potential societal benefits, costs, and risks of continued investment in this medical innovation. Many of our estimates and forecasts are hampered by the fact that very little research is directed toward the nature of technical change in medicine and the supply side of medical technology. We hope this case study points to some useful areas of further research on the relationship of public policy to the development of new medical technologies. At a minimum, an assessment of the artificial heart program provides an opportunity to address policy questions concerning the distribution of research funds for treating heart disease, the equitable distribution of medical technology, and the potential costs to society *before* this life-saving technology is available for therapeutic use.

● These Federal expenditures include \$134 million in National Heart, Lung, and Blood Institute (NHLBI) contracts, approximately \$30 million in NHLBI grants, and \$17 million in Department of Energy (DOE) funding.