
Preface

Medicine is a special profession, and health care is a special commodity. No other group of professionals and no other industry has such an obvious and dramatic effect on our day-to-day welfare. When we are sick, we want to be cured right away or, at least, to begin the process of recovery. Even when we are not sick, we want to monitor the general state of our health and be warned about potential medical problems. Many of us also feel that we, our families, and our communities have a right to receive the best care the system can offer, even when we cannot pay for it ourselves.

Today medical care is provided through complex hierarchical delivery systems that involve complicated science, sophisticated machinery, and a multitude of highly specialized personnel. The contemporary American health care system is a far cry from the structures that provided care at the turn of the century, which often consisted of little more than a rural doctor with few surgical techniques and a drug cabinet almost devoid of effective remedies.

Since the turn of the century, the primary source of the changes that have taken place in health care has been technical innovation. In recent years the rate of innovation has been astonishing and created a medical world about which most of us know very little. Although we certainly appreciate its benefits—longer life, reduced morbidity, lower risks of adverse effects from surgery, reductions in the time spent recovering from illness, safer and more precise diagnostic techniques, and even the disappearance of some forms of disease—technical innovation has often been coupled with increased economic and societal costs. Many patients feel that the system has become inhumane. They are overwhelmed by the complexity of the technologies that are being used to help them and often feel that they are treated as products processed in a hospital assembly line. More are frightened by the prospect of the catastrophic hospital bills that may accompany heroic efforts to save their lives or the lives of their families and friends, whereas others are terrified of being sustained solely by mechanical support.

The ethical dilemmas posed for society as a whole by a technologically based health care system are also profound. We are no longer sure when efforts to sustain life should be continued. It is not clear how much of society's resources should be allocated to the provision of health care based on sophisticated technologies. Nor are we certain about how to fairly allocate the benefits of the system among potential recipients. In short, both as individuals and societies, many of us do not understand the technologies on which our health care system is based or the complex economic and ethical issues that confront us.

This book is intended to explain the technological bases of some of the most important innovations in medical technology and the economic and ethical issues associated with their development and use. It is written for the reader with little or no specialized background in either medicine, engineering, economics, or philosophy and is especially well suited for undergraduates pursuing a liberal arts education as well as those interested in becoming familiar with the social issues posed by the use of medical technology.

The book has three parts: The first part consists of three chapters that identify the major technological, economic and ethical issues associated with the changes that have taken place in the American health care system since the turn of the century. Chapter 1 provides a historical overview of the development of medical technology and its effect on the evolution of the American health care delivery system. Economic issues are examined in chapter 2, in which we describe the role played by changing economic conditions as well as federal and state programs in affecting the development and adoption of new medical technologies since 1950. This chapter also provides an introduction to the techniques of benefit-cost analysis, a set of procedures often used to assess the potential or actual social worth of new medical technologies. Chapter 3 presents an analysis of the types of moral arguments that surround debates concerning the use of new medical technologies.

The second part of the book consists of four chapters, each of which provides an in-depth examination of specific areas of medical technology. Chapter 4 explores cardiovascular medical technology, including cardiac pacemakers, defibrillators, cardiac assist

devices, and the artificial heart. In this chapter benefit-cost analysis is used to assess the economic viability of these cardiac technologies and, in addition, ethical issues posed by human experimentation are examined with special attention given to the artificial heart. Chapter 5 covers critical care technologies, including respiratory therapy, patient monitoring and intensive care units. Economic issues involving the costliness and overuse of intensive care units in contemporary hospital settings are discussed. The ethical dilemmas posed by the life sustaining potential of modern resuscitative and support devices are examined, particularly the question of euthanasia. Chapter 6 covers the utilization of computers in health care, especially in those applications relating to the clinical laboratory, patient medical records, and diagnostic support systems. The questions of whether the use of computers in health care has increased costs, affected the rate of technical change, and reduced employment of health care professionals are considered. The chapter concludes by defining legal liability, examining liability for harm caused by defective software, and discussing the impact of computers on confidentiality and the privacy of medical information. Chapter 7 covers the fundamental principles of several medical imaging modalities, including nuclear medicine, diagnostic ultrasound, computed tomography and magnetic resonance imaging. The economic issues associated with the optimal use of these technologies and their distribution throughout the health care system are discussed. This chapter also deals with the nature of technology assessment and explores the ethical concerns raised by its use.

The last part consists of chapter 8, which focuses on contemporary ethical and social concerns raised by the highly technological character of modern health care. Four issues are discussed: First, the question of whether too much of society's health care budget is devoted to acute care rescue medicine as opposed to preventive medicine, is addressed. Second, the concerns raised by the competition of health care resources between technology and basic research are examined. Third, the complaint that today's highly technological medicine results in the dehumanization of patients is investigated. Finally, the issue of equitable access to medical technology is discussed.