Chapter I – Technological Change in Health Care and its Implications for Society

One of the troubles of our age is that habits of thought cannot change as quickly as techniques, with the result that as skill increases, wisdom fades. (Bertrand Russell)

Introduction

The implication of health care technology most visible to the public and to the health care professions is its effect on the health of the population. Another visible implication is the effect of technology on the organization and delivery of health care. An example of the latter is the influence of technological change on the hospital. In addition, health care technology as a whole and some specific technologies in themselves have important social, ethical, legal, and economic implications (13). Examples of technological advances involving such broader issues are heart transplants, in vitro fertilization, and psychosurgery.

The development, introduction, and use of health care technology thus influences health and health care and may be associated with a broad array of implications (201;241). This is, however, not a one-way process. Patterns of health, the nature of the health care system, and social and economic developments also influence the development and dissemination of health care technology. During the last decades, for example, the public's fascination with technology has been an important force shaping the health care system (11). At present, the visibility of certain (undesired) side effects of use of modern technology, such as dehumanization of care, may encourage movements toward holistic medicine and a growing interest in alternative medicine, which embody different attitudes toward technology (11).

This Chapter concerns this dynamic relationship between health care technology and the social context within which it is used. The
Chapter begins with a short introduction on technological change in general and its role in society. Technological change in general has had a profound influence on health care technology because new instruments as well as new methods in medicine are to a certain extent transferred from other areas of science and technology. The application of lasers, biomaterials, computers and methods of systems analysis are examples. Viewed in a historical perspective, the same observation applies, to mention only the first microscopes by Antonie van Leeuwenhoek and, where methods are concerned, Descartes' *Discours de la Methode*. The Chapter also discusses the definition of health care technology and concepts of health. The Chapter then discusses the implications of health care technology, beginning with a historical perspective, going on to present implications of health care technology, and finally, presents a brief perspective on the future.

**The Role of Technology in Society**

The complex development of technology over time is related to both environmental factors and to progress in science (289). Over many centuries, the development of technology was largely based on empirical knowledge arrived at by trial-and-error. The character of the process of technological innovation has, however, changed over time. A crucial period in the relation between science and technology occurred in the 17th and 18th centuries, when, through the work of such scientists as Descartes, Galileo, and Newton, the concept of nature was changed and the basis for a mechanistic worldview was laid. This new vision of nature - based on the objectivation of nature, the application of the mathematical-deductive method, and the use of experimental investigations - fueled scientific advances and an increasing pace of technological change. In the 19th century, science and technology became truly interdependent. This is exemplified by the rise of industrial technology related to scientific advances in such fields as mechanics, electrodynamics, and chemistry. Science became more technological (through the development, for example, of increasingly sophisticated instruments and tools), while technology became more scientific. In modern society, the traditional disciplinary boundaries between fields of science and between science and technology seem to be dissolving. Although these borders have become more fluid, differences can still be seen with the different goals, methods, and institutionalization of science on the one hand and technology on the other.

The interaction between technology and the environment is also extremely dynamic. Both the culture of a society - its intellectual