Section I

Introduction

CHAPTER 1

Why Study Research?

The ability to read and critically evaluate published research reports is required of all health care professionals, who must be able to assess such things as the usefulness of new equipment, the effectiveness of present and proposed treatment modalities, the quality of services provided, and the adequacy of teaching materials available. Without this skill, no meaningful evaluation of current practices can be made and no research can be planned.

The pursuit of scientific knowledge in any field must ultimately rest on the testing and retesting of new ideas and their practical application. Growing numbers of clinicians, educators, and administrators are conducting their own investigations and critically examining research done by others in their particular field of interest. Even if you never conduct a study, you still must be familiar with the basic concepts of research in order to practice as a professional whose understanding grows from continuing education. The word *research* is here used in a generic sense to mean a systematic method of inquiry.

The main purpose of the *Second Edition* of *Handbook for Health Care Research* is to help you become an educated consumer of medical research. If you want to actually perform research, the best thing you can do is find a mentor, someone who has experience conducting scientific studies and publishing the results. A mentor can help you turn the ideas in this book into practical realities.

Table 1.1 describes the five basic phases of research. Health care workers are usually involved with the second phase, the application of research results in the clinical setting. Within the research continuum, however, infinite opportunities exist to become involved in seeking the answers to questions relating to the practice of health care.

The following discussion outlines several areas of health care where we may apply the principles of scientific analysis to provide a sound basis for patient care. These include health care education, professional accountability, and administration of services.

Health Care Education

Colleges are responsible for graduating practitioners who are knowledgeable and current in the practice of their profession. Educators must stay up to date with new ideas and technology in medicine that affect the diagnosis and treatment of disease.

Table 1.1

The Five Phases of Research

1. *Basic Research.* Seeks new knowledge and furthers research in an area of knowledge rather than attempting to solve an immediate problem.
2. *Applied Research.* Seeks to identify relationships among facts to solve an immediate practical problem.
3. *Clinical Investigations.* Seek to evaluate systematically the application of research findings in the clinical setting, usually in a relatively small patient population.
4. *Clinical Trials.* Seek to determine the effectiveness and safety of clinical treatments in samples of patients drawn from larger populations.
5. *Demonstration and Education Research.* Seek to examine the efficacy of treatments designed to promote health or prevent disease in defined populations.

Critical Evaluation of Published Reports

Keeping abreast of new product and treatment developments is essential for educators. In deciding whether to present a particular piece of equipment or treatment modality to students, instructors must first discern whether the claims for its use and potential benefits rest on a solid scientific foundation. To do so, they must be able to read and critically evaluate reports and tests of function and reliability. A critical reading of scientific journals will provide the basis for decisions concerning classroom demonstrations, guides, and the planning process. Educators may wish to conduct their own investigations as well.

The results of published reports should never be accepted uncritically. Consider this example: the use of intermittent mandatory ventilation (IMV) was claimed to decrease the time required to wean a patient from mechanical ventilation. Yet recent studies have shown that the average length of time a patient spends on the ventilator and in the hospital actually *increased* by the use of IMV.

How much credence should we give to each study's results? Is one or the other limited by its design? Does a non-uniformity of patient populations exist? Were the types of IMV systems used the same in each study? What criteria were used for judging a patient's readiness for removal from mechanical ventilation? Health care educators must ask these types of questions of all studies before passing the results on to their students; they must do more than simply take a study's conclusions at face value.

Continuing Education

To ensure that health care practitioners keep informed of recent developments in their fields, hospital department managers must establish and maintain continuing education programs. Inservice programs provide opportunities to explore and discuss new trends, ideas, and research that occur in the field. Allied health professionals are taking an increasing role in patient education as well as in clinical practice. As they keep current on data relating to, for example, the relationship of cigarette smoking to heart disease or cancer, they can increase a patient's awareness of the appropriateness of particular treatment modalities.

Research on health care practices leads to the reeducation of practitioners and the updating of department procedure manuals. It also leads to the development of new guidelines that improve clinical competence. This occurs as state-of-the-art data on equipment, care modalities, physical diagnosis, and monitoring procedures are made available and their validity tested.

Professional Accountability

Health care professionals are accountable not only to their patients, departments, and hospital administrators but also to government agencies, third-party payers, and the public at large. Our nation's entire health care system is under increasing pressure to justify the cost of services it provides. Government agencies and third-party payers want to know that services provided are both necessary and beneficial.

In times of economic austerity, funding of health care agencies, such as the Food and Drug Administration (FDA) and the Centers for Disease Control and Prevention (CDC), often is reduced. The functioning of these agencies—as well as Medicare, Medicaid, and Blue Cross/Blue Shield—affects health care both directly and indirectly. Investment in health care for the elderly and poor by the government is under close scrutiny to make sure that funds are going to pay for justifiable services. Understandably, with an increased federal role in paying the bills, there is increased pressure to ensure the quality and quantity of care and that it is cost efficient.

The high cost of health care must be supported by scientific research. Regulations governing medical services and reimbursement are based on the current state of knowledge. Relevant questions about a service pertain to its necessity for the treatment of an established medical problem and whether it is of demonstrable benefit to a patient. The task of medical officials is to ensure that the appropriate regulatory body has this information at its disposal. The task of health care researchers is to make certain that the information is based on reliable scientific data.

Administration of Health Care Services

Health care department managers and hospital administrators alike look to the results of carefully completed studies to help solve problems relating to areas of concern such as cost containment, productivity assessment, departmental organization, and employee stress management. Managers are responsible for staffing their departments with qualified personnel, providing services that are delivered in a professional and timely manner, and making certain that infection control, safety, and preventative maintenance programs are ongoing and productive. How can managers best evaluate these services and programs? Which method of providing infection control, for instance, should a manager choose? Knowing that equipment can be a major source of nosocomial infection, the manager needs a reliable method to assess the possible change in infection rate affected by a program of disinfection or sterilization. The manager

will also consider the cost effectiveness of different methods. He or she will ask the same type of questions in evaluating patient and employee safety programs as well as organization, delivery, and evaluation of patient care.

Evaluation of the quality of departmental programs and services is difficult. Empirical observation must not be the basis for acceptance or rejection. The costs of trial and error are too prohibitive for this type of decision-making.

Continuous Quality Improvement

Continuous quality improvement implies the identification of gaps between the current state and the future state as well as a correction process for eliminating the gaps. This correction process is accomplished through the careful and rigid manipulation of variables and the measurement of any effects; in other words, using the scientific method. Only in this way can the physician, patient, patient's family, hospital, and government administrator be assured of the quality of cost-effective services.

Evaluating New Equipment and Methods

Validating Manufacturers' Claims

To meet the changing needs of health care, medical equipment manufacturers introduce to the market new diagnostic and support instruments. Because of the relatively short product life cycle in the market of technical equipment, new products are introduced frequently. But *new* does not necessarily mean *better*. At times, the development of new technology outpaces the need for that technology. When this happens, product marketers have not done their job in accurately assessing demand. Medical professionals must take the lead in ensuring that they are not left in the position of trying to invent ways to use new equipment. New equipment should ideally satisfy a well-established need. Although manufacturers often engage in extensive testing and market research, the final burden of proof as to a product's ultimate function and benefit falls to the end users.

For example, unlike drugs, *modes of mechanical ventilation* are introduced on the market without having the burden of proving that they are effective at improving patient outcomes. What makes this particular example so frustrating is that many of these modes are called by the same name, but the drugs perform very differently on different brands of ventilators. The end users must question whether a new mode makes a difference in any measurable sort of way. Does it make a difference in terms of patient safety, comfort, or duration of mechanical ventilation? Are the potential benefits worth the added expense of this new ventilator feature? These types of critical questions must be asked and systematically addressed when any new piece of equipment is made available in a field. Rather than accept on faith that a new technology will do exactly what its manufacturer claims, health care practitioners should validate claims and conduct comparison tests with existing equipment.

Questions

Definitions

Define the following terms:

1. Basic research
2. Applied research
3. Quality assurance

True or False

1. The most important reason for studying research methodology is to gain the ability to read and critically evaluate studies published in medical journals.
2. The best thing you can do if you want to really learn how to do research is to find a mentor.

Multiple Choice

1. In which of the following area(s) may the principles of scientific analysis to improve patient care be applied?
   a. Education
   b. Continuous quality improvement
   c. Evaluation of new equipment
   d. All of the above