PHARMACEUTICS and PHARMACY PRACTICE

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Acknowledgments

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Preface

It is important to the student reading this book that its concept, objectives, and organization be understood, just as it is important to a student taking any course to understand the objectives, organization, and structure of the course. *Pharmaceutics and Pharmacy Practice* has been written and organized to relate the basic science of pharmaceutics to the actual provision of contemporary and future pharmacy services. The present thrust within pharmacy education is to develop competency-based curricula that interrelate classroom, laboratory, clerkship, and externship components. This approach requires a new type of interrelated course-work structure that is the basis of this book. The goal has been to interrelate pharmaceutic and clinical pharmacy knowledge on drug-delivery systems and its applications in meeting specific drug therapy needs of patients. The text is a departure from its predecessor, *Prescription Pharmacy*, which categorized in chapters the various classes of pharmaceutical products. *Pharmaceutics and Pharmacy Practice* has a totally different structure, based on the belief that the rate-limiting step in translating, applying, and using pharmaceutical knowledge in pharmacy practice is the interfacing of the basic sciences with the clinical applications.

Pharmaceutics and Pharmacy Practice has been organized and written according to the services rendered by and the needs of the present-day and future community and institutional pharmacist. It emphasizes the kinds of information required for professional practice from the standpoints of (1) pharmacy as a system in the total health-care-delivery field; (2) the role of drug therapy as a significant component of patient care; (3) the pharmaceutical elements of drug therapy, including factors influencing drug product safety, effectiveness, and reliability, drug product selection, dosage routes, dosage individualization, and extemporaneous compounding; and (4) the clinical use of drug products and application of drug product information to serve the needs of both other health professionals and patients.

This book represents a new approach to presenting and interrelating pharmaceutical and clinical pharmacy knowledge about drugs and their delivery; it is *not* compartmentalized into galenical drug product classes but rather integrates physicochemical and biologic principles into drug-delivery concepts and methodologies according to various routes of drug administration. The objective is to direct the student's thinking to drug-delivery concepts and the various pharmaceutic and clinical factors influencing rational drug therapy.

The specific objectives of the book are as follows:

1. To provide a bridge between current compartmentalized courses in basic pharmaceutical science and those in clinical pharmacy by directing the educational process of pharmacy students toward competency-based professional goals rather than toward compartmentalized or product-class-related knowledge
2. To consider drug products as drug-delivery systems while emphasizing the various interrelated factors affecting drug and drug product performance and quality

3. To prepare developing pharmacists for current and future practice as therapeutics experts, who can combine a knowledge of drugs with that of available drug administration forms, to provide the patient with the safest, most effective, and most reliable therapy possible

The book has been organized into four distinct sections. The first section provides an overview of pharmacy as a system for acquiring and translating knowledge about drugs into products and services. An introductory chapter describes pharmacy as a system in the health-care delivery process in which pharmacists use knowledge of pharmaceutics and drugs in order to provide drug product distribution and drug informational services directed toward promoting safe and effective use of drugs. Chapter 2 deals with current concepts pertaining to the development and evaluation of drug product quality and performance.

The second section is concerned with basic concepts of pharmaceutics. Chapter 3 discusses basic physical-chemical principles and methods of analysis underlying a drug product's performance. Chapter 4 covers basic concepts in biopharmaceutics, including consideration of factors that influence the concentration of active ingredient released from the dosage form and entering the systematic circulation. Specific attention is given to drug product factors that influence the rate and extent of absorption of active drug from various absorption sites together with physiochemical factors that affect the processes of dosage form movement from site of administration to site of absorption, release of active drug from dosage form, and the absorption, distribution, metabolism, and excretion of the active drug. Various patient and "environmental" factors that may affect drug bioavailability and pharmacokinetics are also treated in detail.

In section three, patient factors affecting the choice and use of dosage forms are considered (Chap. 5) as are the various literature resources that a pharmacist will be required to call upon during the course of his or her professional practice (Chap. 6). In the patient factors section, the many factors that influence choice of dosage form and appropriate modes of use are treated in detail. These include factors related to a particular disease condition or patient condition, acceptability factors related to drug-use compliance, and methods and content of patient communication on proper use of dosage forms. In the literature resources chapter, the various literature resources that relate to drug-delivery systems and their appropriate use are described. Specific case histories are used throughout the chapter to illustrate how literature resources are employed in actual practice to answer clinical questions.

The fourth section is devoted to the various drug-delivery systems, according to route of drug administration. The six chapters (Chaps. 7–12) cover, respectively, oral drug-delivery systems, parenteral drug-delivery systems, topical systems for the skin, topical systems for the eye, ear, and nasal mucosa, inhalation drug-delivery systems, and drug-delivery systems for rectal, urethral, or vaginal use. The chapters in this section have a similar general organization. An introductory section describes the scope of the method of administration, perhaps some of its historical developments, the types and classes of drug-delivery systems employed by the route, the advantages and disadvantages or particular requirements of the route and the drug-delivery systems used, limitations of the route, if any, and the relative importance and status of the route to pharmacotherapy. In general, the second part of each chapter considers the relevant anatomy and physiology of the route, including the physiologic factors affecting reliability, effectiveness, and safety of the route. Disease factors, if any, affecting the particular route, and other considerations are given. The third section of each chapter deals with pharmaceutic elements, including classes of dosage forms; physical-chemical considerations in product design; general principles of dosage form design and formulation; in certain cases, typical formulation components with illustrative examples; extemporaneous compounding techniques and guidelines; processing methods and control; and particular quality features and standards for evaluation, including those related to safety, reliability, and patient acceptance. Where appropriate, particular instructions to the patient or pharmacist are also provided, including general methods and guidelines of use, special patient instructions or precautions, toxicity or drug therapy considerations, if any, related to special forms, patient acceptance factors, and special storage considerations or handling requirements.

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1

Pharmacy As A System In Health-Care Delivery

Gilbert S. Banker

Robert K. Chalmers

GROWTH IN THE SCIENCE OF DRUGS AND DRUG PRODUCTS

A CONTEMPORARY EXAMINATION OF PHARMACY PRACTICE

THE PHARMACIST AS AN INFORMATION EXPERT ON DRUGS AND DRUG PRODUCTS

THE PHARMACIST'S ROLE IN DRUG PRODUCT SELECTION AND USE

SUMMARY

The traditional concept of pharmacy, as defined in the standard dictionaries, is "the art or science of compounding and dispensing medicines." From the earliest written records of pharmacy practice, until the 20th century, this definition accurately reflected what both society and the health care professions expected from pharmacists. However, since the turn of the century, scientific and technological advances in the development of drugs and their dosage forms, as well as advances in the knowledge of optimal drug use in disease treatment and control, have led to tremendous growth in the pharmaceutical industry. This industry has been responsible for most of the drug-related research in this country and now manufactures nearly all of the drug products used in patient care today. The diminished necessity for extemporaneous compounding, coupled with expanded knowledge of drugs and their dosage forms, is leading to an evolutionary shift in the role expectations of pharmacists to meet the needs of an ever-changing health-care delivery system.

> A century ago medicines were compounded by a pharmacist in his pharmacy and dispensed or sold directly to a patient, either upon the order or prescription of a physician or in many cases upon the direct request of the patient. The pharmacist compounded the medicine from plant or animal matter or from naturally occurring materials. . . . The great change in

pharmacy began near the end of the nineteenth century with the rise in synthetic chemistry. The pharmacist was no longer limited to naturally occurring substances but had at his command a rapidly growing number of man-made materials. . . . The design, development and production of synthetic chemicals and the drugs derived from them required both knowledge and facilities which the self-employed pharmacist did not possess. . . . The result of this change rapidly removed most of the compounding of drugs from the pharmacy and placed it in an industrial enterprise. The inevitable result has been a clear and substantial, although not absolute, separation of compounding and dispensing into two distinct activities. . . . For a time the manufacturer prepared the materials which the pharmacist assembled to prepare the dosage of medicine specified by the physician's prescription. Soon, however, it became more economical for the manufacturer to assume the responsibility for dosage formulation. . . . The result of these changes was undoubtedly a much greater efficiency and large reduction in cost. The economy of scale of the concentration of scarce scientific and technological manpower and the opportunity for automation were available to large manufacturing corporations. . . . The result obtained more powerful drugs of more standardized quality and probably at a lower production cost, but the self employed pharmacist ceased for the most part to be a compounder of drugs and became primarily a dispenser.[1]

The discovery of chemicals with specific effectiveness in the control of bacterial infections, of emotional disorders, of high blood pressure, and of other disease processes affecting mankind led to the development of a large number of new drugs during the 1940s and 1950s, and to a corresponding increase in the number of prescriptions written by physicians. Although the vast majority of prescribed drugs were for premanufactured products, the increased volume of prescriptions and the number of new drugs in a variety of commercial dosage forms and units led pharmacists to focus their concern on the safety aspects of the dispensing process—getting the right drug product in the appropriate dosage concentration, accurately labeled, to the right patient.

GROWTH IN THE SCIENCE OF DRUGS AND DRUG PRODUCTS

The 1960s and 1970s have provided a tremendous amount of important information about the safe and effective use of drugs in patient care. This information has resulted from expanding basic and applied research on the study of disease processes, new drug development, follow-up studies on reported adverse effects of drugs used in the general population, advances in analytical chemistry technology which allow for more precise studies of the fate of drugs following administration of dosage forms, and the drug use behavior of people. These studies have added greatly to a growing knowledge of the science of drug product design and formulation (*i.e.*, pharmaceutics); the factors affecting the predictable release of drugs from their dosage forms, and drug absorption to the intended site(s) of action (*i.e.*, biopharmaceutics); and the application of rate processes involved in drug absorption, distribution, metabolism and excretion to the design of dosage regimens (*i.e.*, pharmacokinetics). Studies have also added significantly to knowledge of the multiple actions of drugs that can account for unintended drug-drug and drug-disease interactions, the behavioral factors that lead patients to deviate from the intended plan for use of their medications, and the consequences of unintentional misuse, as well as frank abuse, of potent drugs. These findings continue to multiply and underscore the true complexity of the knowledge and information with which pharmacy deals.

> It is complex because it deals with drugs and with people. Drugs are complex chemical substances with complex pharmacological properties. To understand them, their structure, and their properties requires a high degree of chemical and pharmacological knowledge and sophistication. People are even more complex than chemicals or drugs. The effect of a given drug dosage upon a patient is by no means always predictable. Drugs do not dissolve at the same rate; they are not absorbed at the same rate into the blood stream; they are not

metabolized at the same rate; they are not excreted at the same rate in all individuals. Some individuals are allergic to certain drugs. The state of health or disease of the individual has a profound effect upon the pharmacological and physiological effects of a given drug. Beyond these differences there are complexities which arise from psychological, cultural and social factors. Diet, exercise, the use of drugs all can and do alter the pharmacological effects of drugs in individual patients.[2]

A CONTEMPORARY EXAMINATION OF PHARMACY PRACTICE

These advances in biomedical knowledge have been associated with corresponding changes in the public's expectations for health services and in the pharmacy profession's desire to be of greater service to society's health-care needs. There is a definite need for the profession, the health-care system in general, and society as a whole, to examine the key objectives and responsibilities which pharmacy, through its educational and practice development efforts, can pursue. During the 1970s two independent projects of this type, leading to highly interrelated outcomes, were undertaken. One of these, The Study Commission on Pharmacy, sponsored by the American Association of Colleges of Pharmacy, was charged to "determine the scope of pharmacy services needed in the health-care system and project the educational processes necessary to ensure these services are obtained." The Commission's 2-year study, beginning in 1973, arose from a recognition among pharmacy education leadership that pharmacy education lacked a common frame of reference which could interrelate its teaching and research efforts to optimally meet the needs of preparing pharmacists for present and future practice. The other project, The National Study of the Practice of Pharmacy, cosponsored by the American Pharmaceutical Association and the American Association of Colleges of Pharmacy, was designed to define the specific responsibilities and tasks of pharmacists in each environment of practice. Such a detailed description should serve as the basis for more highly directed efforts to prepare and assist pharmacists in maintaining their ability to provide optimal pharmacy services.

THE STUDY COMMISSION ON PHARMACY

The Study Commission on Pharmacy consisted of broad representation from pharmacy practice, education and industry, as well as from medicine, nursing, clinical pharmacology, social science, and higher education administration. Chaired by the distinguished Dr. John S. Millis, who had chaired similar studies of medicine and allied health professions, a majority of the commission members were nonpharmacists. The Study Commission began its deliberations with the conceptualization of the health-care delivery system as a matrix. Pharmacists represented one element of the matrix as did other health professionals, and representatives from the pharmaceutical industry, governmental agencies at both the state and federal level, health service institutions (hospitals, clinics, long term care facilities), educational institutions, diverse health insurance organizations, and consumer groups. Thus, there are interfaces between pharmacists and other individuals, institutions, and organizations in the health-care delivery system matrix. The approach used by the Commission was to examine systematically, through background reading and through intensive discussions with individuals representing other elements of the matrix, most of those interfaces with pharmacy. These discussions led to a consensus on the following:

1. The important role of drug therapy in health-care delivery and the variety of problems faced in achieving optimal use of drugs in today's society
2. The discontinuities or gaps at the interfaces between components of the health-care delivery system, particularly as they relate to problems in achieving optimal use of drugs
3. The need for greater coordination of efforts between components of the health-care delivery system and patients to bridge the gaps and reshape the system in ways to improve the drug use component of patient care

The Commission took note of the changes in drug use complexity in the past 20 years and the associated evolving changes in the concepts and practices of pharmacists. On this basis, the Commission proposed that the traditional definition of pharmacy was too narrow in its scope and provided

limitations to evolving the pharmacist's role in relation to societal needs. The Commission recommended that pharmacy be defined as a health service based on a system of knowledge. Pharmacy, like other health services, is committed to applying its knowledge to the restoration and maintenance of health. It differs only in the degree to which its knowledge appears as a product.

> The Study Commission advances the concept that pharmacy should be defined basically as a system which renders a health service by concerning itself with knowledge about drugs and their effects upon men and animals. Pharmacy generates knowledge about drugs, acquires relevant knowledge from the biological, chemical, physical and behavioral sciences; it tests, organizes and applies that knowledge. Pharmacy translates a substantial portion of that knowledge into drug products and distributes them widely to those who require them. Pharmacy knowledge is disseminated to physicians, pharmacists, and other health professionals and to the general public to the end that drug knowledge and products may contribute to the health of individuals and the welfare of society. The knowledge system of pharmacy through its therapeutic use is a substantial and significant segment of health care in the United States.[3]

The Commission predicted that pharmacy, and the health-care system as a whole, can expect to be in a state of continuing change for many years to come, but that the rate of change will be much faster than during the last 20 years. The Study Commission report intends to provide a frame of reference for pharmacy education, and the profession at large, in guiding these evolutionary changes to the best interests of society, the health-care system, and the profession. Its recommendations relate to the following:

1. The needs to be met through pharmacists' services
2. The systems for optimal provision of pharmacists' services
3. The nature of pharmacy education's responsibilities for professional education and research activities to prepare pharmacists to provide these services as well as to help evolve the systems for optimal provision of these services

The Needs to be Met Through Pharmacists' Services

The Commission viewed pharmacy as a knowledge system concerned with rendering a health service and it identified the availability and use of drug information as the most critical unmet need. These concepts, however, should not be interpreted to mean that pharmacists will in time become primarily or exclusively concerned with the drug information component of pharmacy. Pharmacy services should continue to include drug distribution, as well as patient education, drug use monitoring, and drug information to other health professionals.

Systems for Optimal Provision of Pharmacists' Services

The theme present throughout the Study Commission Report was the fragmentation of our health-care system that has caused deficiencies in the acquisition and use of drug knowledge. These deficiencies are due to gaps within the system of pharmacy itself, as well as gaps at the interfaces between pharmacy, other health professions, and the patient in the matrix. An efficient system, which seeks to better interrelate drug product distribution and control, with drug information acquisition and use, was viewed as the best system to help close these gaps. Consequently, the Study Commission emphasized that an increased degree of organization in pharmacy practice is essential. Such organization should increase efficiency without decreasing professional control over drug distribution. Organization which establishes practice relationships between the pharmacist, other health-care providers, and the patient is the objective that will optimize the provision and use of drug information as well as drug products. Common examples of organized health-care services are institutions, such as acute-care hospitals and long-term care facilities. Organization of health-care services, however, does not have to be synonymous with the institutionalization of those services. Community pharmacies having organizational relationships with other specific health-care providers can also participate as part of a system of coordinated health-care delivery for ambulatory patients. The community pharmacy represents a health-care resource that is accessible (*i.e.*, is located in close proximity to where people live). Practice development models in which community pharmacies have organizational relationships with other health-care providers

must be demonstrated as a vital component of the evolving health-care delivery system.

The Nature of Pharmacy Education's Responsibility for Professional Education and Research Activities

The objectives of pharmacy education should emphasize development of competencies to serve individual and societal drug use needs. In this context the Commission urged that pharmacists who work or practice in widely differentiated roles within the system of pharmacy (*i.e.*, community pharmacies, hospitals, long-term care facilities, industry, education) still recognize their common roots in pharmacy education, and their common concern for contributing to pharmacy's mission of promoting the safe, effective, and economical use of drugs. The content and strategy of pharmacy education should provide for acquisition of relevant, specific knowledge and skills relating to drugs and people. In this context, the Study Commission recognized the difficulties in determining the "what" and "how much" of each science to include in the finite time available within the curriculum. It was recommended that curriculum design and content selection be based on the knowledge and skills needed for specific competencies expected of the graduates of that particular program (rather than attempting to cover broadly, within the curriculum, all aspects of the sciences which represent the faculty's fields of expertise and interest). The Study Commission also recommended that attention be directed to the relative emphasis given to physical and biological sciences as compared to the social and administrative sciences. This recommendation is not intended to minimize the importance of the physical, chemical, and biological sciences in developing ready knowledge of drugs and their safe and effective use. However, the Study Commission wished to call attention to the equally critical need for pharmacists to have ready knowledge about people, about relationships and communication, and about the operation of systems and costs of services. Furthermore, the role of research was viewed by the Study Commission as being essential to the mission of pharmacy education because of its contribution to the continuing education of faculty, to the generation of new knowledge, and to the solution of real and practical problems in pharmacy. In this context the Commission Report urged that faculty research in schools of pharmacy be directed to focus on problems of pharmacy practice and gaps in drug knowledge. As such, this recommendation has the potential to provide many bridges over existing gaps among pharmacy education, pharmacy research, and pharmacy practice.

A CONTEMPORARY DEFINITION OF PHARMACY PRACTICE

In 1978, the American Pharmaceutical Association, through action of its House of Delegates, established a modern day definition of pharmacy practice which embraced the concepts proposed by the Study Commission on Pharmacy. "The American Pharmaceutical Association advocates that pharmacy practice be defined as a patient-oriented health service that applies a scientific body of knowledge to improve and promote health through assurances of safety and efficacy in drug use and drug-related therapy."[4] The key distinction between the traditional and contemporary definitions of pharmacy is a concern of contemporary practice, not only for the preparation and distribution of drug products but also an overall concern for selecting quality drug products and an optimal course of therapy tailored to the patient's needs, in addition to ensuring, through advising the patient and other health professionals, that the drugs are administered properly and to contributing to monitoring patient drug therapy to help ensure that medications are used as intended and that the patient's response is optimal.

THE NATIONAL STUDY OF THE PRACTICE OF PHARMACY

A related national project that has been underway since 1973 is playing a major role in defining the full scope of the pharmacist's responsibilities in developing these dimensions of contribution to patient care. The project, cosponsored by the American Pharmaceutical Association and the American Association of Colleges of Pharmacy, has resulted in a detailed delineation of the responsibilities and tasks which should represent the attributes of this patient oriented, scientifically based, contemporary pharmacy practice. An important component of this project, "The National Study of the Practice of Pharmacy," provided systematic feedback from a cross section of over 1600 pharmacists throughout

the country representing all environments of practice.[5]

The Standards of Practice for the Pharmacy Profession

An analysis of the study findings led to the document entitled "The Standards of Practice for the Profession of Pharmacy."[6] Although no one pharmacist performs all of the identified responsibilities and tasks, this document represents collectively the components of management, service provision, and interprofessional relationships essential to developing comprehensive pharmaceutical services in every environment of practice. The proportion of these responsibilities, which define the role for any one pharmacist, will depend on the size of the practice and the related degree of role differentiation. Each of the sections of The Standards of Practice document identifies responsibilities which the pharmacist is uniquely trained to perform. In light of the complexities of drug therapy, these responsibilities represent the unique and important contributions of a pharmacy's services. This document also addresses the scientific, technological, and clinical background necessary for conceptualizing drug products as drug-delivery systems, and for understanding the various interrelated factors that affect drug product quality, drug product performance, and appropriate drug product use in patient care.

THE PHARMACIST AS AN INFORMATION EXPERT ON DRUGS AND DRUG PRODUCTS

Pharmacists, nurses, and physicians all receive education about the actions, indications, and uses of drugs through formal courses in pharmacology as well as through clinical training and postgraduate experience. Accordingly, pharmacists, nurses and physicians all have a level of expertise in drug therapy consistent with the intensity of their education. While courses in pharmacology are generally not as extensive in schools of nursing as in schools of medicine, the pharmacology courses in many schools of pharmacy are as extensive, if not more extensive, than those in schools of medicine. Furthermore, while both pharmacists and physicians receive basic education on drugs, their actions, and their uses, pharmacy students today clearly receive superior education in drug products. The modern pharmacy curriculum emphasizes the various dosage forms available, their constituent ingredients, and the physical and chemical properties that influence the performance of the dosage form as a drug-delivery system; the indications for use of each type of dosage form as related to drug and patient factors; specific directions for their use; special stability and storage precautions; various sources of drug product supply; pertinent factors to evaluate the quality and performance potential of commercially manufactured drug products; and the appropriate technology and scientific principles for extemporaneous preparation of dosage forms to treat special patient needs. Accordingly, the pharmacist is the most knowledgeable member of the health care team regarding the many factors affecting drug product selection, use and performance evaluation.

Particular attention has been given by this book to those responsibilities of pharmacists, delineated in The Standards of Practice report that relate to pharmaceutic aspects of drug therapy in contemporary practice (see Appendix I). These responsibilities identify knowledge and practice competency goals related to basic drug and drug product knowledge, patient factors in drug use, the use of reference materials, application of drug and drug product knowledge to general pharmacy service operations, and application of this knowledge to the patient and to other health professionals. Specific competency goals covered in this text include the following:

BASIC DRUG AND DRUG PRODUCT KNOWLEDGE

A competent pharmacist should have a working knowledge and understanding of the physical and chemical characteristics of drugs and drug products, of the physical-chemical principles and processes involved in drug product formulation and the composition of dosage forms, of the stability characteristics (physical, chemical, and microbiologic) and storage requirements of drugs and drug products, of the factors that may influence the physiologic availability and biologic activity of the drugs from their dosage forms, and of the factors underlying the chemical equivalency and bioequivalency evaluation of multisource drug products.

KNOWLEDGE OF PATIENT FACTORS IN DRUG USE

A competent pharmacist should have a knowledge of the dosage form indications and regimens for prescription and nonprescription drugs used for specific diagnostic, preventive or therapeutic purposes in accordance with particular patient needs, and a knowledge of the factors that encourage and deter patient drug use compliance.

USE OF REFERENCE MATERIALS

A competent pharmacist should be able to recognize appropriate reference sources and their applicability to resolving drug product-related problems encountered in pharmacy practice; to locate and use various indices to the pharmaceutical and medical literature in order to conduct a literature survey; to use various information sources and systems to retrieve information on pharmaceutical and therapeutic aspects of medication preparation and use; to defend professional judgments based on critical evaluation and interpretation of the pharmaceutical and medical literature.

APPLICATION OF DRUG AND DRUG PRODUCT KNOWLEDGE TO GENERAL PHARMACY SERVICE OPERATIONS

A competent pharmacist should be able to establish drug quality specifications for drugs to be purchased; to determine primary and alternate suppliers for pharmaceutical items; to compound appropriate drugs or combinations into acceptable dosage forms which are physically, chemically, and microbiologically stable, biologically effective and esthetically appealing; to develop and maintain quality control procedures for drugs that are prepackaged, bulk compounded, or sterile product formulated; to establish and monitor a system to ensure proper storage conditions for perishable pharmaceutical items; and to develop and maintain a system for regular removal from storage areas of all outdated pharmaceutical items.

APPLICATION OF DRUG AND DRUG PRODUCT KNOWLEDGE TO THE PATIENT

A competent pharmacist should be able to interrelate the pharmaceutic and therapeutic objectives with patient information to determine the optimal route of administration, dosage form, and dosage regimen for a given therapy, and should be able to communicate effectively with a patient on the instructions for proper use and storage of prescription and nonprescription drug products.

APPLICATION OF DRUG AND DRUG PRODUCT KNOWLEDGE TO OTHER HEALTH PROFESSIONALS

A competent pharmacist should be able, with the availability of appropriate source materials, to recommend the drug product or dosage form that is most useful for a particular diagnostic, preventive, or therapeutic need and should be capable of objectively supporting that choice.

THE PHARMACIST'S ROLE IN DRUG PRODUCT SELECTION AND USE

A major responsibility of today's pharmacist, as noted in the previous section, is to advise, counsel, and consult on the selection and use of drugs and drug products. One of the primary objectives of this book is to relate the pharmaceutic properties of drug products to their clinical application and use; to provide the pharmacy student with a basis to advise authoritatively on the proper choice of all types of dosage forms; when they should and should not be used; which specific types should be used for certain kinds of patients; how they should be employed for most effective results, especially with respect to their administration relative to meals and other drugs; and equally important, how to select the best quality drug products at a reasonable cost for the patient.

The selection of the specific brand of the product to be dispensed for multiple source products is often left to the pharmacist. Through the establishment of institutional procedures involving a Pharmacy and Therapeutics Committee, the hospital pharmacist is responsible for setting quality standards and product specifications which determine the manufacturing sources of drugs used for patient care in the hospital. In nearly every state, drug product selection laws have come to replace the antisubstitution laws which formerly existed. Accordingly, the community pharmacist is also