

# PHARMACOTHERAPEUTICS

## FOR *Advanced Practice Nurse Prescribers*

Teri Moser Woo | Marylou V. Robinson

FOURTH EDITION



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# PHARMACOTHERAPEUTICS FOR ADVANCED PRACTICE NURSE PRESCRIBERS





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# PHARMACOTHERAPEUTICS FOR ADVANCE PRACTICE NURSE PRESCRIBERS

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I would like to dedicate this book to my family.  
My husband, John, and my three sons, Michael,  
Patrick, and Nicholas, have been wonderfully  
supportive as I have completed this project.

TMW

To my students who continually impress me with their  
idealism and inspire me to always strive for excellence.

MVR



The increasing volume of pharmacology-related information presents a challenge to acquire and maintain current knowledge in the area of pharmacotherapeutics. The number of new drugs coming on the market each year, the changes in “the best” drugs to use for any given disease state based on the latest research, the influence on patient and practitioner alike of advertising and promotion, and restricted formularies create competing pressures on the prescriber. This book is designed to provide nurse practitioner students and the nurse practitioner in the primary care setting with a thorough, current, and usable pharmacology text and reference to address these challenges.

The design of this book assumes knowledge of basic pharmacology from one’s undergraduate education in nursing. Although a brief review of basic pharmacology is presented in **Chapter 2**, the focus of the book is on advanced pharmacology and the role of the advanced practice nurse in pharmacotherapeutics. The authors of the text are practicing nurse practitioners, pharmacists, or selected specialists in a field. The book is by advanced practice registered nurses, for advanced practice registered nurses.

## ORGANIZATION

This book is organized around four distinct content areas: The Foundation, Pharmacotherapeutics with Single Drugs, Pharmacotherapeutics with Multiple Drugs, and Special Drug Treatment Considerations.

### The Foundation

The 13 chapters in Unit I provide the foundation of advanced pharmacology and the link between this knowledge and professional practice. Chapter 1 discusses the role of the advanced practice registered nurse (APRN) in both the United States and Canada as prescriber and the knowledge needed to actualize this role. Current issues about the evolving role and education of these providers are also presented in this edition, including discussion of the Doctorate of Nursing Practice.

Discussion of the roles of other advanced practice nurses in prescribing is included. Factors involved in clinical judgment related to prescribing are a central focus, and collaboration with other health-care providers is also presented.

The pharmacology knowledge required for rational drug selection requires more depth than that given in undergraduate pharmacology, where the focus is on safe administration of drugs prescribed by someone else. Advanced pharmacology information on receptor reserve and regulation, bioavailability and bioequivalence, metabolism of drugs, including a focus on the cytochrome P450 microsomal enzyme system, half-life, and steady state are provided in **Chapters 2 and 8**. Information central to the prescribing role includes an in-depth

discussion of volume of distribution and therapeutic drug monitoring. Volume of distribution is important in prescribing drugs with very large or very small volumes of distribution and for selecting drugs for patients with cardiac or renal failure, during pregnancy, or when a patient is underweight or obese. Knowing what tests to order and when to order them to assess plasma drug levels by bioassay and to monitor for adverse drug reactions are necessary in making choices about when or if dosage alterations are required or drugs need to be stopped. These topics are also covered in **Unit I**.

Legal and professional aspects of the prescriber role are presented in **Chapter 4**. Issues surrounding the legal authority of the APRN to prescribe a drug, the conditions under which the prescription may be written, and how to write the prescription are presented. Risk management issues are also discussed, including informed consent, dealing with multiple providers, and substance abuse and drug-seeking behaviors.

Nurse practitioners have a history of high levels of patient satisfaction with the care provided. This is related, in part, to their holistic approach to each patient. Several chapters are devoted to information that reflects this approach. Cost, knowledge deficits, dealing with complex treatment regimens, and negotiating a shared responsibility for drug management are discussed in **Chapter 6**. Many patients choose to use complementary therapies such as herbal remedies. **Chapter 10** discusses herbal therapy and other complementary therapies.

A relatively new area in pharmacotherapeutics is ethnopharmacology. As more research is done in this area, treatment guidelines are beginning to include which drugs are best for different racial groups. Cultural and ethnic considerations in prescribing drugs are the subject of **Chapter 7**. Pharmacogenomics involves the influence of both race/ethnicity and individual genetic make-up on drug metabolism. **Chapter 8** provides a discussion of the role of pharmacogenomics in prescribing.

Consideration of drug and food interactions has long been a part of nursing knowledge, but the interrelationship between nutrition and drug therapy beyond these interactions has been largely overlooked. **Chapter 9** provides a discussion of this interrelationship, including nutritional supplementation and nutrition as therapy.

In an age of integrated use of technology, the APRN must be able to acquire information about drugs and to deliver care to patients using technology. The use of electronic health records (EHR) to aid in prescribing decision making is found in **Chapter 11**.

Cost issues cannot be ignored when making prescribing decisions. **Chapter 12** provides a discussion of pharmacoeconomics.

Over-the-counter drugs may be prescribed by the APRN or chosen by patients on their own. These drugs are often erroneously perceived to be less powerful and have fewer adverse reactions than prescription drugs. Understanding their role in pharmacotherapeutics is the focus of **Chapter 13**.



## Pharmacotherapeutics With Single Drugs

The next two units are organized around specific drugs and the diseases they are used to treat. The chapters in Unit II are organized to provide easy access to information based on specific drug classes. Many practitioners have a personal formula of drugs they use for disease processes that they commonly see. When presented with a patient requiring drug therapy, they know the class of drug from which they will make a rational drug choice. The information they seek is about drugs within that class that would be most appropriate for their patient.

Pharmacokinetics, pharmacodynamics, and pharmacotherapeutics for each drug class are discussed in the chapters in Unit II. The chapters include tables with easy-to-access information on the pharmacokinetic properties of each drug, drug interactions, clinical use and dosing, and available dosing forms. A major focus is on rational drug selection and on monitoring parameters. Patient education specific to each drug class is provided—designed around administration of the drug, adverse drug reactions to monitor for and what to do if they occur, and lifestyle modifications that complement the drug therapy.

To provide the most up-to-date, accurate, and relevant information possible, contributors to this unit are practicing clinicians and the newest published guidelines are consistently used. The “Clinical Pearls” features, drawn from the daily practice of these contributors, are incorporated throughout the text. Drugs currently in development that may influence drug choices in the near future are also included in the “On the Horizon” features.

## Pharmacotherapeutics With Multiple Drugs

The chapters in Unit III provide drug information from the viewpoint of the disease processes they are commonly used to treat. Patients often have complex health and illness issues and treatment needs requiring multiple drugs in different drug classes. Unit III facilitates acquisition of complex prescribing knowledge by providing information from a disease process format. The diseases in this unit are those commonly seen in primary care and for which multidrug therapy from more than one drug class may be recommended.

Pharmacotherapeutics is discussed in Unit III in relation to the pathophysiology of the disease and the goals of treatment. Each chapter explores how patient variables, economic considerations, concurrent diseases, and drug characteristics influence rational drug selection. Evaluating outcomes along with guidelines for consultation and referral are included. Where relevant, the newest published professional guidelines are incorporated. Each patient is unique and no set of guidelines or treatment algorithm applies to each patient. However, these tools, drawn from the clinical knowledge and experience of experts in a given specialty, are helpful in rational drug selection, especially for the student and novice practitioner. Clinically based case studies,

provided in an online supplement to this edition, provide a framework for application of pharmacotherapeutic knowledge.

## Special Drug Treatment Considerations

Unit IV focuses on special populations. Age-related variables are explored in **Chapter 50**, “Pediatric Patients,” and **Chapter 51**, “Geriatric Patients.” Gender variables are considered in **Chapter 48**, “Women as Patients,” and **Chapter 49**, “Men as Patients.”

The final chapter in the book deals with one of the most common yet often perplexing issues with which prescribers deal: pain. **Chapter 52** focuses on management of both acute and chronic pain across the age continuum. The fourth edition includes the most current information on newer drugs used to treat chronic pain and new pain assessment tools for patients with dementia. The chapter includes a discussion of the legal aspects of prescribing related to drug-dependent patients and includes coverage of Material Risk Assessment and Pain Management Contract documents.

## FEATURES

Throughout the text, care has been taken to provide the reader with a consistent and logical presentation of material. Visual appeal is provided through the generous use of tables, illustrations, and flowcharts. Other features are unique to the specific units:

### Unit I chapters

- In-depth pharmacology base for advanced pharmacotherapeutics
- Herbal and complementary therapies
- Ethnopharmacology and pharmacogenomics
- Nutrition and nutraceuticals as therapy
- Pharmacoeconomics
- Information technology including EHR and how it is used in a busy practice

### Unit II chapters

- Tables for ease of access to information
  - Pharmacokinetics tables
  - Drug Interactions tables
  - Dosage Schedule tables
  - Available Drug Dosage Forms
- Rational drug selection and monitoring parameters
- Patient Education
- Clinical Pearls
- On the Horizon feature

### Unit III chapters

- Integration of pathophysiology and pharmacotherapeutics
- Integration of professional treatment guidelines
- Drugs Commonly Used tables
- Patient Education displays

## Unit IV chapters

Variables related to special populations

Pediatrics

Geriatrics

Women

Men

Pain management

## SUMMARY

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Every effort has been made to make this text as comprehensive, accurate, and user-friendly as possible. The generous use of tables for ease of access to information, the focus on rational drug selection, the inclusion of often hard-to-find

monitoring parameters, and the integration of patient education throughout the text are examples of this user-friendly approach. The authors hope that you will find this a valuable resource both as a student and in your practice.

TMW

MVR

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I would like to acknowledge my mentors who have supported me throughout my nursing career. Included in this list are Dr. Sheila Kodadek, who has been my mentor and friend throughout my nursing career, and the late Dr. Terry Misener.

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UNIT I

# THE FOUNDATION





# THE ROLE OF THE ADVANCED PRACTICE NURSE AS PRESCRIBER

Teri Moser Woo • Marylou Robinson

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Nurses have been administering medications prescribed by another provider for many years. The knowledge base to safely perform this activity has been an integral part of basic nursing education. With the advent of the advanced practice nurse, the role of the nurse in relation to medications has evolved to include prescribing the medications as well as administering them. The prescriber role requires additional knowledge beyond that taught in undergraduate nursing programs. More than that, it requires the willingness and ability to assume a different level of responsibility for this activity. Advanced practice nurses other than nurse practitioners (NPs) may gain prescriptive authority or prescribe under protocol; therefore, the term *advanced practice registered nurse* (APRN) will be used in this chapter to include NPs, certified nurse midwives (CNMs), certified registered nurse anesthetists (CRNAs), and clinical nurse specialists (CNSs) with prescribing authority, as determined by the individual state nurse practice

act. The focus of the discussion will remain primary care prescribing.

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## ROLES OF REGISTERED NURSES IN MEDICATION MANAGEMENT

### Registered Nurses

Experienced registered nurses (RNs) often find themselves in the position of discussing what might be the “best” drug a patient should receive with a physician or other prescribing provider. The RN is an advocate for the patient and his or her input should be sought and highly valued in the prescribing process. Collaboration between the nurse and prescriber improves patient safety and the quality of care the patient receives; however, the responsibility for the final decision regarding which medication to prescribe remains with the prescriber.

## Advanced Practice Registered Nurses

APRNs have a higher level of responsibility related to pharmacotherapeutics than RNs. The nature of this responsibility depends on whether the APRN can prescribe medications. States vary in their laws related to prescriptive authority for APRNs. Twenty-one states have fully independent prescribing by nurse practitioners (AANP, 2013b; National Council of State Boards of Nursing, 2015). Some states have full or limited prescribing allowed by CNSs, including Alaska, Colorado, Connecticut, Hawaii, Iowa, Idaho, Minnesota, Montana, Nevada, New Mexico, North Dakota, Oregon, Utah, Vermont, Washington, DC, and Wyoming (National Council of State Boards of Nursing, 2015).

Because nonprescribing APRNs have in-depth knowledge of the drugs used in their specialty areas, their collaboration with the health-care providers who are prescribing is valuable. They may assist in determining the pharmacotherapeutic protocols for their patients and may be credentialed by their organization to select drugs within those protocols to be administered to their patients. These roles related to pharmacotherapeutics represent an intermediate level of responsibility between the staff RN, who administers drugs chosen by another provider, and the NP, who prescribes a drug without the need for a protocol. APRNs also collaborate with other providers in designing and implementing research protocols to test the efficacy of a new drug. They also have a central role in educating nurses and other providers in the appropriate use of these new drugs.

## ROLES AND RESPONSIBILITIES OF APRN PRESCRIBERS

APRNs exist in a range of practices and include certified RN anesthetists, certified nurse midwives, and others whose title includes the words *nurse practitioner* or *advanced practice registered nurse*. The responsibility for the final decision on which drug to use and how to use it is in the hands of the APRN prescriber. The degree of autonomy in this role and the breadth of drugs that can be prescribed vary from state to state based on the nurse practice act of that state. Every year, the January issue of the *Nurse Practitioner* journal and an issue of the *American Journal for Nurse Practitioners* present a legislative update providing a summary of each state's practice acts as they relate to titling, roles, and prescriptive authority. As of January 2015 (Philips, 2015), the following were true of NP regulation of practice and prescribing authority:

- All states have title protection for NPs.
- Only Oregon has mandated third-party reimbursement parity for NP services.
- In all but five states, the control of practice and licensure is within the sole authority of the state's board of nursing. These five states have joint control in the board of nursing and the board of medicine.
- Scope of practice is determined by the individual NP's license under the nurse practice act of the licensing

jurisdiction. Some have a graduated scope based on experience level. New prescribers need to understand that their employment sites may restrict this legal scope of practice but cannot extend it.

- In 17 states and the District of Columbia, NPs have independent scope of practice and prescriptive authority without a requirement or attestation for physician collaboration, consultation, delegation, or supervision.
- Six states have full autonomous practice and prescriptive authority following a period of postlicensure/postcertification supervision or collaboration.

The 2010 Institute of Medicine's (IOM) publication *Future of Nursing: Leading Change, Advancing Health* called for removing scope of practice barriers and allowing NPs to practice to the full extent of their education and training (IOM, 2010). Many states are responding to this call, with the expectation that the above list will be significantly modified in years to come.

## ADVANCED KNOWLEDGE

General knowledge about the pharmacokinetics and pharmacodynamics of drugs, how to administer them safely, and what to teach the patient is learned in undergraduate nursing courses and subsequently refined in practice. Additional knowledge, critical thinking, and assumption of a higher level of legal responsibility are required to assume the prescriber role. Knowledge of medicine, pharmacology, and nursing intertwine in the NP role. As a prescriber, it becomes the role and responsibility of the NP to determine the diagnosis for which the drug will be ordered, prescribe the appropriate drug, monitor the expected outcome of the drug, and incorporate a holistic assessment of the impact of disease and therapy on patient lives.

The APRN role requires advanced knowledge about pathophysiology, medical diagnoses, and pharmacology to choose an appropriate drug. Determining the medical diagnosis is not within the scope of this book, but rational drug selection requires knowledge of the disease processes (medical diagnoses) for which a drug may be prescribed and the mechanism of action of a specific drug and how it affects this disease process. Rational drug selection is discussed throughout the book.

The prescriber role requires advanced pharmacology knowledge beyond that taught in basic nursing education. Knowledge required for rational drug selection includes, for example, bioequivalence and cost when deciding whether to use a generic form of a given drug; the enzyme systems used to metabolize a drug for deciding about potential drug interactions; and the pharmacokinetics of a drug for determining the loading, maintenance, and tapering doses. The terms may sound familiar, but the underlying depth of information and the role of this information in determining the best drug to prescribe are beyond basic nursing pharmacology knowledge. Volume of distribution, for example, receives little discussion in undergraduate nursing pharmacology texts, but it is often critical in determining dosage for drugs with very large or

small volumes of distribution and in selecting drugs for patients with cardiac or renal failure, pregnant patients, or patients who are underweight or obese. Assessment of plasma drug levels by bioassay may be a familiar concept, but the use of this knowledge to determine whether a drug should be prescribed or the prescription altered will be new. The RN may know a given drug's effect on renal functioning, but the prescribing APRN needs to know what tests to order and when to order them to appropriately monitor that functioning, as well as when or if to alter the dosage or stop the drug. Diagnostic tests and their role in drug monitoring may be briefly covered in a basic nursing pharmacology course, but appropriate modification of drug therapy based on results is added knowledge that an APRN needs to be a safe prescriber.

A nurse who is studying to be an APRN will need additional knowledge about prescriptive authority. Does the chosen drug fit within the legal authority of an APRN to prescribe in his or her state? What are the conditions under which the prescription may be written, and how does one correctly write it? What constraints may be in place because of the patient's health insurer or lack of health insurance?

Additionally, the APRN needs to be aware of new drugs that come on the market, medication alerts, and label changes due to postmarketing analysis. In 2014 there were a record 41 novel new drug entities approved by the U.S. Food and Drug Administration (FDA), with an average of 25 new drugs approved annually (U.S. Food and Drug Administration Center for Drug Evaluation and Research, 2015). The FDA sends out alerts to health-care providers via the MedWatch Safety Alert system as new information becomes available from post-marketing surveillance and modifies drug labels as appropriate. Ever-changing drug information requires the APRN to remain up-to-date on drug information at all times.

## BENEFITS OF AN APRN AS PRESCRIBER

Although the focus of this book is on pharmacotherapeutic intervention, alternative treatment options are also part of the armamentarium that can be used to treat a given disorder and may interact with the pharmacotherapeutic intervention. Discussion of common therapies that may be chosen as treatment options or that are integral to drug therapy is integrated throughout the drug-specific and disease-specific chapters.

Some therapies have traditionally been part of what all nurses teach, and they remain central to the role of the APRN, for example, lifestyle management issues for a cardiac patient, relaxation techniques for a patient experiencing stress, and appropriate exercise for a patient with low back pain or arthritis. Herbal therapies have been part of the health practices of people throughout history, but it is only recently that health-care providers have acknowledged them and considered them in planning treatment. If the APRN chooses to use herbal therapy or the patient is using this therapy as suggested by another provider, there must be reliable resources

about the therapy and its impact on prescribing. This book includes a separate chapter on herbal therapy and the uses of complementary therapies and also integrates the use of herbal interventions throughout.

Nutrition is also a common issue in nursing, but often the nurse's knowledge of nutrition related to pharmacology is limited to food-drug interactions or the low-sodium diet for a patient with hypertension. Knowledge regarding how foods and nutrition affect drug prescribing is integrated throughout the book; how foods are used as therapy is included in Chapter 9, "Nutraceuticals."

Choosing among pharmacological and other treatment options also involves advanced knowledge. The right choice depends on accurate information about the patient and his or her situation and the effects of any alternative treatment options on health outcomes. Choices also depend on the patient's culture, preferences for different health outcomes, attitudes toward taking risks, and willingness to endure often uncomfortable adverse drug effects during treatment for some possible future benefit.

Characteristic of APRNs and their practice are consideration of the whole patient, the joint setting of therapeutic goals with other members of the health-care team, and the inclusion of the patient in each decision about care. This holistic approach remains a central element in APRN practice and is often cited by patients and other providers as a hallmark and distinguishing feature of APRN practice when compared with other primary care providers. Adherence to a drug treatment regimen has traditionally been less than optimal. Statistics cited often place patient adherence (taking the drugs as prescribed) at less than 50 percent. Research shows that adherence is better for prescriptions given by NPs than by physician assistants (Manhattan Research, 2013). The reasons for the difference include consideration of the whole patient and inclusion of the patient in decision making. Another factor in improved adherence is patient education; APRNs spend more time than other providers in teaching their patients about the disease process and the relationship of the treatment regimen to it (Gielen, Dekker, Frecke, Mistiaen, & Krozen, 2013; Manhattan Research, 2013). Each of these important aspects of drug choice and utilization is covered in this book.

## CLINICAL JUDGMENT IN PRESCRIBING

Prescribing a drug results from clinical judgment based on a thorough assessment of the patient and the patient's environment, the determination of medical and nursing diagnoses, a review of potential alternative therapies, and specific knowledge about the drug chosen and the disease process it is designed to treat. In general, the best therapy is the least invasive, least expensive, and least likely to cause adverse reactions. Frequently, the best choice is to have lifestyle, non-pharmacological, and pharmacological therapies working together. When the choice of treatment options is a drug, several questions arise.



### Is There a Clear Indication for Drug Therapy?

In the age of health-care reform and increased awareness of the limitations of drugs, whether a medication is the best option for treatment has become an important question. For example, in treating acute otitis media, guidelines regarding the use of antibiotics has been evolving. A high percentage of otitis media infections resolve without intervention, so how does one know that the antibiotic was the cause of the cure? Of concern is organisms' resistance to antibiotics, with antibiotic overtreatment considered a contributing factor to resistance. Before drug therapy is chosen, the indication for and necessity of using a drug should be carefully considered.

### What Drugs Are Effective in Treating This Disorder?

Several drugs may be effective in treating a condition, so which one is best for a particular patient? Even if only the most effective class of drug is considered, few classes of drugs include only one drug. How does one determine "best"; what are the criteria? Are there nationally recognized guidelines that can be used? The Agency for Health Care Quality (AHCQ), the National Institutes of Health (NIH), and many specialty organizations publish disease-specific treatment guidelines that include both pharmacological and nonpharmacological therapies.

### What Is the Goal of Therapy With This Drug?

What is the best drug to achieve treatment goals? Various goals are possible in the choosing of therapy. The goal may be cure of the disease and short term in nature. If cure is the goal, troublesome adverse effects may be better tolerated and cost may be less of an issue. If the goal is long-term treatment for a chronic condition, adverse effects and costs take on a different level of importance, and how well the drug fits into the lifestyle of the patient can be a critical issue.

### Under What Conditions Is It Determined That a Drug Is Not Meeting the Goal and a Different Therapy or Drug Should Be Tried?

At the onset of therapy, the provider and patient should have a clear understanding of what outcome or goal is expected of the medication prescribed. Follow-up and monitoring times are established to see how well treatment with the drug is meeting the goal. Often, monitoring parameters are published for a drug but may need to be adjusted based on the age or concurrent disease processes of the patient. Part of the decision-making process may include questions about when to consult with or refer the patient to a specialist.

### Are There Unnecessary Duplications With Other Drugs That the Patient Is Already Taking?

The patient's medication history should be reviewed at each encounter to detect duplications or medications that may be discontinued. Sometimes drugs from different classes are given together to achieve a desired effect, and

this is a therapeutic choice. It may also be that the provider is not aware of the overlap, especially if the patient is seeing several different providers. For example, a patient who is on a diuretic to treat hypertension may be receiving potassium supplementation. Another provider may decide to use an angiotensin-converting enzyme (ACE) inhibitor to treat heart failure. An ACE inhibitor can also be used to treat hypertension. Rather than a treatment regimen with three drugs, it may be possible to use a combination of an ACE inhibitor with a diuretic in one tablet, and because ACE inhibitors cause potassium retention, no supplemental potassium would be needed. Use of an integrated electronic health record can assist the provider in discovering duplication of therapy and collaborating with other providers to develop a simplified regimen.

### Would an Over-the-Counter Drug Be Just as Useful as a Prescription Drug?

Increasing numbers of drugs are being moved from prescription to over-the-counter (OTC) status. This may lead to a reduction in cost for the patient, or it may increase patient costs due to insurance no longer paying for the medication. Patients may not consider OTC medications as "drugs" because they are not prescribed; therefore, a careful history of all medications would specifically ask about OTC medications.

### What About Cost?

Who will pay for this drug? Can the patient afford it? Will the cost of the medication affect adherence to the treatment regimen? Cost is an issue for several reasons. Many insurance policies do not cover the cost of drugs or only provide partial coverage, so the patient must pay "out of pocket." The newer the drug, the more likely the cost is to be high based on the drug manufacturer's need to reclaim research and development costs while the corporation still holds the patent on that drug. Newest is not always best, and consideration of cost is a major factor in choosing between newer drugs and ones that have been around long enough to be available in generic form. Many insurance plans have larger co-pays for name-brand drugs than for generic medications. Multiple national retail pharmacies have developed \$4.00 prescription formularies. Awareness of what is on the local discount formulary may save the patient hundreds of dollars in prescription costs and may increase compliance. Factors likely to lead to poor adherence include a drug that is expensive in relation to a patient's finances, a drug that must be taken daily as part of a complex regimen, and a drug that is not covered by insurance.

### Where Is the Information to Answer These Questions?

Nurses evaluate sources of drug information and learn which ones to trust. For an APRN, the sources of drug information expand to include the wide array of professional literature that ranges from the well-reputed journals to literature from specialty and professional organizations, the multitude of computerized drug databases (e.g., Micromedix, Lexicomp,

Epocrates), information from the U.S. Food and Drug Administration, and formula programs that can be accessed via a handheld device or computer.

The APRN prescriber needs to evaluate how reliable the drug information is. How can reliability be determined? Is the information source written by someone who may benefit from presenting biased information? Is the information source current? Today's "wonder drug" may be removed from the market tomorrow. Is the information relevant to the specific patient for whom the drug will be prescribed? If the information is a research report, what type of research design was used? Are there questions about the validity and reliability of the data? Are national or international guidelines used to inform prescribing or does the reference suggest prescribing outside established guidelines? To prescribe drugs appropriately, APRNs must be able to answer these questions; to answer them, they must master sources of information and use them on a regular basis.

## COLLABORATION WITH OTHER PROVIDERS

No one member of the health-care team can provide high-quality care without collaborating with other team members. They most often collaborate with physicians, pharmacists, podiatrists, mental health specialists, therapists, and other providers, including APRNs who are not NPs, physician assistants (PAs), and other nurses.

### Physicians

Collaboration with physicians has been something of a roller-coaster ride for NPs. Early in the development of the NP role, physicians were the teachers in the NP programs and accepted NPs as physician-extenders. As the role of the NP evolved to clearly indicate that it was advanced nursing practice, and as legislation made autonomy of practice possible, the relationship became more adversarial, with the American Medical Association (AMA) issuing statements regarding the NP and PA scope of practice (AMA, 2009), often for economic reasons. An AMA document, *AMA Scope of Practice Series: Nurse Practitioner*, stated, "It is the AMA's intention that these Scope of Practice Data Series modules provide the background information necessary to challenge the state and national advocacy campaigns of limited licensure health care providers who seek unwarranted scope-of-practice expansions that may endanger the health and safety of patients" (AMA, 2009, p 4). The AMA responded to the IOM *Future of Nursing* report by reiterating that NPs are not qualified to provide patient care because of lack of hours in clinical education (Patchin, 2010).

Although this struggle still continues at the national level (Patchin, 2010; American Academy of Nurse Practitioners [AANP], 2013; AMA, 2013), NPs and physicians do work together very effectively on an individual basis and in collegial care teams. In an era of health-care reform, our joint concerns about patient care decisions require us to be allies.

Physicians may offer insight or advice on pharmacological management from their experience. A physician's expertise related to pharmacology is based on understanding biochemistry and prescribing for a given pathophysiology. The emphasis is on the disease and the drug, with less emphasis on the impact on the patient. Patient education by physicians may be limited or left to a nurse or pharmacist.

APRNs traditionally approach prescribing drugs in a slightly different manner from that of physicians. As APRNs prescribe a drug for a given pathophysiology, their nursing background leads them to place equal emphasis on understanding the impact the drug will have on the patient. Patient education is a central focus of nursing and APRN practice. Knowledge and clinical experience shared from the mingling of medical and nursing perspectives are mutually beneficial to the providers and the patient. The APRN can benefit from the in-depth knowledge about the drugs in the physician's specialty area. The physician can benefit from APRNs' focus on the impact of the drug on the patient and from their patient education skills. In the age of health-care reform, increasing emphasis is being placed on these latter issues.

### Pharmacists

Collaboration with pharmacists requires an understanding of the educational preparation for and evolution of the role of the pharmacist. The profession of pharmacy requires graduate-level preparation for all pharmacists with the granting of a practice doctorate, the Doctor of Pharmacy (PharmD). PharmDs have extensive knowledge about pathophysiology and take an active role in determining the best drug to prescribe. A PharmD can assist by offering expertise on the clinical management of patients, including available dosage forms, potential adverse reactions, and drug interactions. Both physicians and APRNs increasingly consult PharmDs for their knowledge of pharmacokinetics and pharmacotherapeutics when prescribing for complex patients. In some jurisdictions, PharmDs have some independent prescriptive authority.

### Other APRNs

Collaboration with other NPs and APRNs who have prescriptive privileges has two major advantages. On a one-to-one basis dealing with individual patient issues, NPs and APRNs can share "clinical pearls" from their knowledge base and collaborate to improve the care of the patient. Collaboration on issues related to scope of practice and prescriptive privilege at the state and national level is critical to obtaining and maintaining the autonomy of practice needed to provide optimal patient care.

### Physician Assistants

The focus of the PA's practice is similar to that of the physician, so both the APRN and the PA can benefit from interaction with each other in much the same way as from their interaction with physicians. Many PAs desire more

autonomy in their practice, and the experience of APRNs in developing autonomy may be helpful. At this time, such autonomy does not exist, so it is important to know the laws that govern the practice of the PA as well as the APRN in the state to determine how collaboration can best occur.

## Nurses Not in Advanced Practice Roles

APRNs regularly collaborate with other nurse colleagues who are not in advanced practice roles. Some have specialized knowledge, such as Certified Diabetes Educators (CDEs) and Wound and Ostomy Care Specialists (WOCS). These nurses and their assistants carry out the prescriptive orders of the APRN. For each of these care providers, it is important to remember their preparation and knowledge level and their legal responsibility in carrying out the APRN's orders.

RNs and licensed practical/vocational nurses function under their own licenses. Their preparation and responsibility are defined by the nurse practice act in each state. Whether they can legally take orders from an APRN is also delineated in these statutes. When prescribing drugs that others will administer, APRNs must know the nurse practice act in the state in which they practice. Medical assistants (MA) may have certification in the state that delineates their preparation, but they are generally not licensed. Their knowledge of drugs may be limited, if they have had any formal education in the area of pharmacology beyond administration. When prescribing drugs to be administered by MAs, APRNs must ensure that the MA clearly understands what they are to do; careful oversight is critical.

## CANADIAN NURSE PRACTITIONER PRACTICE

There are over 3,000 APRNs in Canada (Canadian Nurses Association, 2015). As in the United States, where APRN scope of practice and regulation vary from state to state, NP scope of practice and regulation in Canada vary from province to province. NPs practice independently in most of the provinces with the exception of Prince Edward Island, where NPs must practice with a collaborating physician. The scope of practice for NPs also varies from province to province, as well as by practice setting. There are now pediatric, family practice, adult, and anesthesia NPs who can prescribe in Canada. Mental health NPs are working on prescriptive authority and currently must qualify as a prescribing NP in either adult, pediatric, or primary care.

In 2012, the Canadian federal government approved the New Classes of Practitioner Regulations (NCPR) under the Controlled Drugs and Substances Act that removed federal restrictions on NP authority to prescribe controlled substances. NCPR allows NPs to prescribe medications included in the Controlled Drugs and Substances Act when treating patients if they are authorized to do so under provincial/territorial legislation. Each individual province

and territory must individually implement the NP scope of practice to include prescribing controlled substances.

## CURRENT ISSUES AND TRENDS IN HEALTH CARE AND THEIR EFFECT ON PRESCRIPTIVE AUTHORITY

### Autonomy and Prescriptive Authority

The growth in autonomy and prescriptive authority for NPs and other APRNs is a source of pride. APRNs have now successfully overcome the “cannot prescribe,” “cannot diagnose and treat,” and “cannot admit” prohibitions to practice that have required so much time and energy to overturn in the past. More states are broadening and expanding the legal, reimbursement, and prescriptive authority to practice for all APRNs, including NPs. By January 2004, all states had recognized the NP title, scope of practice, and prescriptive authority in legislation. Momentum to full autonomy is gaining, with 26 states allowing independent practice for NPs and 21 states allowing independent full prescribing as of January 2015 (National Council of State Boards of Nursing [NCSBN], 2015). APRNs in other states have also gained recognition, although the scope of practice and prescriptive authority is often more restricted.

These gains are not written in stone, however, and can be reversed. Despite continuing research studies (Newland, 2009; Pearson, 2009; Gielen, 2013) that demonstrate the effectiveness of the role of the APRN in improving patient outcomes, barriers remain. Major concerns related to prescriptive authority must continue to be addressed. Not all states have legislation that permits APRNs to prescribe independently of any required physician involvement. Turf battles continue between APRNs and physicians at national and many state levels over physician supervision requirements and co-signatures on prescriptions. The advent of the doctorate of nursing practice (DNP) degree with its comparable level of education to that of other health-care providers and a focus on independent practice may address some of these issues about supervision. However, the American Medical Association continues to stress the need for physician supervision and final authority for the patient, even for APRNs who hold the DNP (Partin, 2008; AMA, 2010, 2013). This push for physician control occurs despite data from malpractice and malfeasance ratios that clearly show that the rationale for physician supervision is unfounded (Pearson, 2009).

### Interdisciplinary Teams

In a study by Kaplan and Brown (2004), the top three barriers to effective prescriptive authority for NPs all related to interactions with physicians. Among the top twelve, two related to interactions with pharmacists. It is time to put this battle behind us and work together to create teams of health-care professionals who work together to foster excellent health care for every patient. Such teams would provide care of higher quality with better patient outcomes if the strengths of each team member were fully utilized. Research and systematic reviews

comparing care given by such teams with that given by physicians alone supports this assertion (Gielen, 2013). The Institute of Medicine Committee on Health Professions Education (2003) states, “All health professionals should be educated to deliver patient-centered care as members of an interdisciplinary team, emphasizing evidence-based practice, quality improvement approaches and informatics” (p 45).

## Level of Education of Team Members

One of the issues to be addressed in interdisciplinary teams is the level of education of the various providers. When the levels of education differ, issues of collegiality, collaboration, and, especially, supervision arise. Medicine has been at the practice doctorate level for more than 50 years. Pharmacists have moved the level of education to enter their profession to the practice doctorate (PharmD). APRNs are now addressing this issue. Recognizing that gaps exist between what is taught in master’s-level education programs and the knowledge that is needed for practice, in 2004 the American Association of Colleges of Nurses (AACN) in collaboration with the National Organization of Nurse Practitioner Faculties (NONPF) formed a task force to develop the practice doctorate, and publish core content and competencies for such educational preparation. The title granted to the practice doctorate in nursing is the doctor of nursing practice. In 2006, the AACN organization published *The Essentials of Doctoral Education for Advanced Nursing Practice* (<http://www.aacn.nche.edu>). In April 2006, NONPF published the entry-level competencies for the graduate of a DNP program (<http://www.nonpf.com>). These competencies were replaced by NONPF in 2011/2012 with a common document that encompassed all competencies expected of NPs entering practice after graduation. Competencies related to scientific foundation, leadership, quality, practice inquiry, technology and information literacy, policy, understanding of health delivery systems, ethics, and practice are core to all NPs (NONPF, 2011/12).

A date of 2015 was set by the AACN for the educational preparation of all APRNs, including CRNAs, CNMs, CNSs, and NPs, to be at the doctoral level. A 2014 Rand study, “The DNP by 2015” (Auerbach et al., 2014), sponsored by AACN, found that of the 400 schools offering APRN education, 30 percent offered BSN to DNP programs and 58 percent had MSN to DNP programs. Barriers identified by schools that had not adopted the DNP include that the DNP is an option—not a requirement—for practice. Internal or institutional barriers included faculty resources and clinical sites.

In 2014, there were 241 DNP programs with 14,699 students enrolled (<http://www.aacn.nche.edu/dnp>). An additional 59 DNP programs were in the planning stages. In 2014, the AACN convened a group to evaluate the recognized variance that occurs within and across programs in order to establish more consistency in graduate outcomes and capstone projects, with the outcome not available as this text went to print. This move to the same level of education as other members of the health-care provider team will address some of the issues

surrounding the interdisciplinary team. The content of this book is consistent with the recommendations of both the AACN and the NONPF related to the knowledge base in pharmacotherapeutics for DNP-prepared nurses.

## Reimbursement

The passage of legislation and the adoption of regulations related to reimbursement is evolving, with the Affordable Care Act rollout creating an opportunity for APRNs to address reimbursement parity. However, the reimbursement by third-party payers continues to be a practice barrier for many nurses in advanced practice. In 2013, Oregon was the first state to pass payment parity for APRNs.

The transfer of additional accountability for Medicaid from the federal government to the states also has the potential to jeopardize the implementation of federal mandates for services and access to APRNs as providers, especially if APRNs are seen as primary care providers only to underserved populations that are financially undesirable to physicians. APRNs must be careful that they not be seen as physician-substitutes or physician-extenders but rather as APRNs who bring a different perspective and science to patient care; otherwise, the current autonomy we enjoy and the level of autonomy we hope to attain may disappear.

Private-sector and government restructuring of health care with a focus on cost control and for-profit groups has both positive and negative potential for the autonomy of the APRN. The negative aspect is that treatment options and decision making about their use are often transferred to the corporation or the government. This can limit the APRN’s ability to determine treatment options, and the extra time the APRN takes to educate and counsel patients may be seen as a liability rather than as an asset. From a positive point of view, APRNs have demonstrated their ability to control costs and improve patient outcomes (Pearson, 2009). We must continue to conduct research on the ability of APRNs to provide competent, cost-effective, high-quality services to improve the health of our patients, whether in NP-only practices or in collaborative practices, and to share the findings of that research with the decision makers in the changing world of health care. Better yet, we must become decision makers.

APRNs and other providers must address these challenges and take control of their future in health care so that preferred outcomes are achieved rather than outcomes designed and implemented by others. This requires a commitment of time and energy from each APRN to work together with other providers and other nurses to deal with these issues at local, state, and national levels. Keeping current on new knowledge in pharmacology and on the latest drugs and their clinical applications is only part of the role of the health-care provider as prescriber. APRNs should join and support their professional organizations and engage in positive political activity to maintain the prescriptive authority already gained in each state and to extend autonomous prescriptive authority to all states.