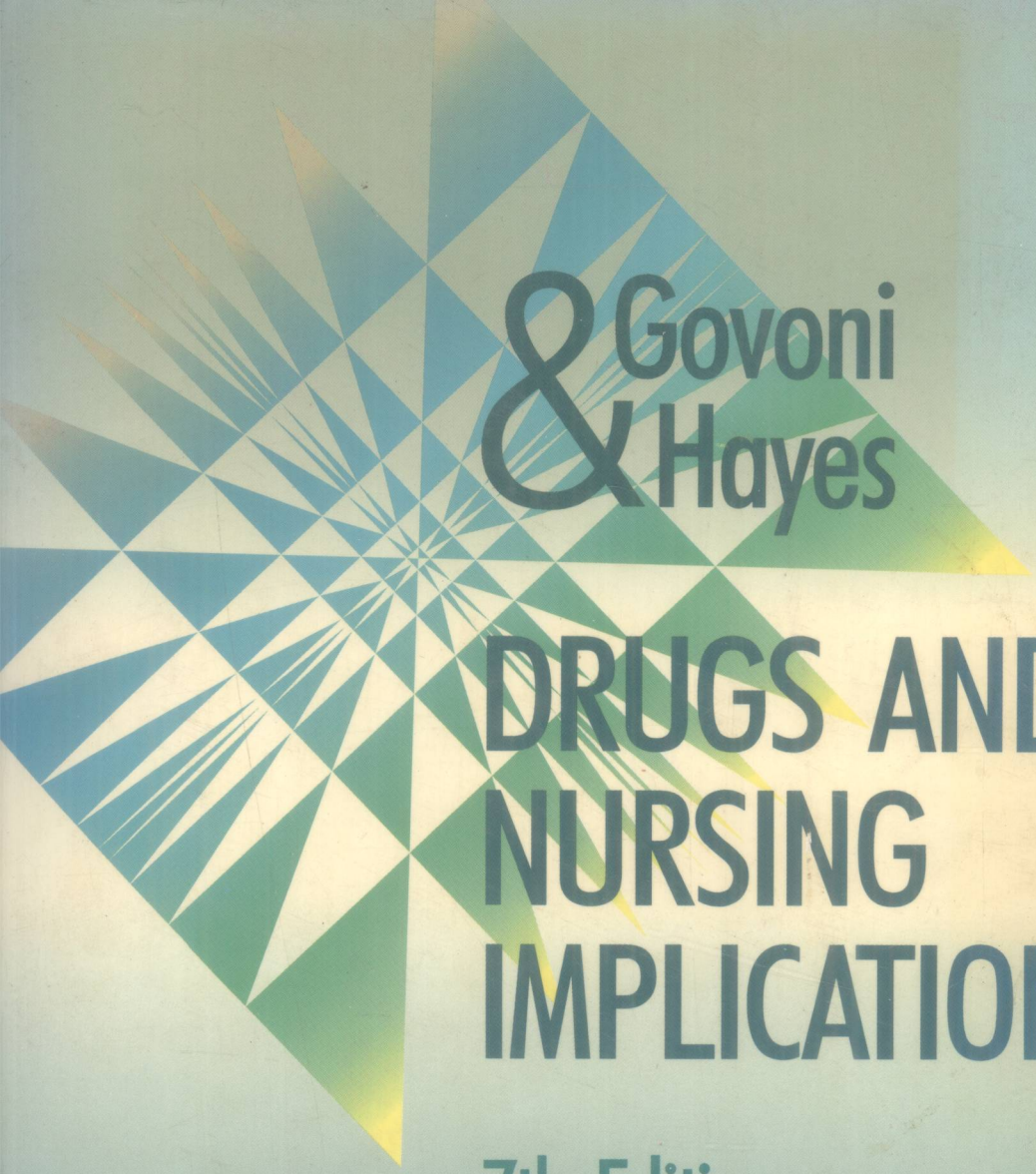

Govoni & Hayes

DRUGS AND NURSING IMPLICATIONS

7th Edition

Shannon & Wilson

& Govoni Hayes

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& Govoni Hayes

DRUGS AND NURSING IMPLICATIONS

To

Alvin, Theresa, Ellen, and Michael,

without whom this edition would not have been possible

◆

PREFACE

The seventh edition of *Drugs and Nursing Implications* remains true to the commitment of previous editions to provide nurses with a comprehensive drug reference. Each drug monograph has been carefully developed to provide the nurse with all the current information needed to make appropriate decisions regarding drug administration. This edition, however, has been extensively revised to make it easier to use and more consistent with the nursing process approach to patient/client care.

We recognize that decision making relative to pharmacotherapeutics is a complex and intrinsically cyclic process. For example, assessments are made both prior to and following drug administration. These assessments provide data for (1) evaluation of the therapeutic efficacy of the drug, (2) evaluation of the efficacy of nursing interventions, (3) decisions regarding continuation or modification of nursing interventions, and (4) development of new nursing diagnoses with related nursing interventions. Thus, nursing diagnoses may change as a result of an achieved therapeutic effect, therapeutic failure, manifestation of an adverse/side effect, or a demonstrated learning need.

Because the decision-making process related to drug administration is a cyclic one, the Nursing Implications section of each monograph is formatted in a straightforward manner, with sections on administration, assessment and drug effects, and patient and family education. From these sections the reader can easily identify information pertinent to an individual patient situation and readily incorporate it into the nursing process.

One of the many new features of the seventh edition is the inclusion of seven chapters on pharmacotherapeutics and the role of the nurse in drug administration. These chapters provide information essential for each nurse to know. Two other significant changes to the seventh edition are related to prototype drugs and IV drug administration information.

Prototype drugs are considered representative of all drugs in their particular drug classification. In general, all drugs in the class will have similar actions, uses, side effects, and nursing implications as the prototype drug. Thus learning about the vast number of drugs available can be simplified by focusing on the prototype representative of each class.

The prototype drugs were placed in the alphabetical listing in previous editions. In this edition the prototype drugs have been placed in a separate section and arranged by pharmacologic and therapeutic classification similar to the classification scheme used by the American Hospital Formulary Service (AHFS). This arrangement of the prototype drugs by pharmacologic and therapeutic category enables the nurse to identify different classes of drugs that have similar therapeutic implications or that primarily affect the same physiologic system. This arrangement allows for a more logical physiologic approach to learning about drugs. Throughout this book most drugs are keyed to a prototype drug. If no prototype is indicated,

the drug has a unique pharmacologic action and cannot meaningfully be placed in a class with a single representative agent. A summary of the prototype classifications and their representative drugs is listed inside the front and back covers for easy reference.

New to this edition is comprehensive information regarding administration of IV drugs. Each IV drug monograph contains directions related to drug reconstitution, dilution, method of administration, rate of infusion, and nursing assessment and interventions specific to the IV form of the drug. Thus the seventh edition eliminates the need for additional resources related to administration of IV drugs.

With the addition of chapters on pharmacotherapeutics and the role of the nurse in drug administration, the emphasis on prototypes as representatives of drug classes, the inclusion of comprehensive IV drug information, and extensively developed drug monographs, this book becomes a comprehensive resource for drug administration that can be used also as a basic pharmacology text.

We believe that the changes incorporated into this edition will be welcomed by nurses, student nurses, and other health-care professionals who have come to rely on *Drugs and Nursing Implications* as the definitive resource for drug administration.

Margaret T. Shannon
Billie Ann Wilson

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The authors wish to express their appreciation to Barbara Norwitz, Editor in Chief, Appleton & Lange, and to Mary Espenschied, CRACOM Corporation, for the assistance they provided in the development and preparation of this edition.

Finally the authors wish to express their appreciation to all their past and present nursing students who have provided the inspiration for this work. It is for these individuals and all who strive for excellence in patient care that the revision of the work was undertaken.

How to Use This Book

Introductory chapters have been provided as a resource for those seeking essential information about pharmacotherapeutics and the nurse's role in drug administration. The reader is directed to carefully review this material and refer to it when specific information is needed relative to some facet of drug administration.

A glossary of Clinical Conditions and Associated Signs & Symptoms related to drug use has been provided in Chapter 3. Throughout the book the reader is referred back to this glossary for specific clinical manifestations of conditions associated with drug use, such as hypokalemia and Cushing's syndrome.

Any given drug can be known by a variety of names. First it will have a formal chemical name that describes its chemical structure. Early in development the pharmaceutical manufacturer may assign the drug a code name, which is much easier to use than the formal chemical name. If the drug looks promising and the manufacturer anticipates marketing the drug, a "nonproprietary" or *generic* name is given to the drug. The generic name then becomes the official name for the drug in the United States. The manufacturer then assigns a "proprietary" name that is trademarked by the individual manufacturer. This name is known as the *trade* or *brand* name of the drug. The trade name is used by the manufacturer to market the drug to physicians and pharmacists. Because a single drug can be made by several different pharmaceutical manufacturers, the generic name is the preferred name when learning about drugs. The generic name can also help identify a drug's pharmacologic class and prototype.

The drugs are listed in the alphabetical section of the book by *generic* name. Each drug is indexed by both its generic and trade name. Combination drugs will not be found in the alphabetical section of this book since they are referenced solely by trade name. An appendix of commonly used combination drugs with their generic components has been provided so that each component may be located separately in the alphabetical section. When a combination drug is noted in the index, the reader will be referred to the appendix.

Generic names for all drugs discussed in the book are listed in the alphabetical section, and the reader will be referred to a specific page in the prototype section, Section II, if the drug is a prototype for a class of drugs. If the drug is not a prototype but belongs to a class for which a prototype has been designated, the reader will note that the prototype drug is identified above the generic name for the drug. The reader should review all the information provided in each drug monograph, as well as the information provided under the prototype for the class. Individual drug monographs contain the following information:

Generic and Trade Names and Classifications The generic name is given followed in parentheses by its phonetic spelling. Common trade names are listed followed by the drug classifications.

Pregnancy Category Drugs may be categorized as category A, B, C, D, or X according to risk-benefit ratio for the mother and fetus, with A being the lowest and X the highest risk. If the FDA pregnancy category is known, it will be indi-

cated. Refer to the appendix for a more complete description of pregnancy categories.

Schedule Controlled substances, such as narcotics, are classified as belonging to one of five schedules I to V according to abuse potential, with I having the highest and V the lowest potential for abuse. Refer to the appendix for a more complete description of each schedule.

Actions/Pharmacodynamics This entry describes the mechanism by which the specific drug produces physiologic and biochemical changes at the cell, tissue, or organ level.

Uses The therapeutic applications of each drug are described in terms of normal use and unlabeled use. An unlabeled use is literally one that does not appear on the drug label or in the manufacturer's literature on the use of the drug. The unlabeled use is, nevertheless, an accepted use for the drug.

Route & Dosage Route is specified as SC, IM, IV, PO, PR, nasal, ophthalmic, vaginal, topical, aural, and intrathecal; doses are listed separately for adult and child and according to use.

Pharmacokinetics This section lists information about onset, peak, and duration of drug action. It also lists the mechanism of metabolism and elimination when known.

Contraindications & Precautions Many drugs are contraindicated and therefore should not be used in specific pathophysiologic conditions, during pregnancy, or with particular drugs or food. In other cases the drug should be used with great caution because of a greater than average risk or untoward effects.

Adverse/Side Effects Virtually all drugs have adverse/side effects that may be bothersome to some individuals but not to others. In this entry, adverse/side effects are listed according to systems or organs with the most common printed in italics and those that are life-threatening underlined.

Diagnostic Test Interferences This entry describes the effect of the drug on various diagnostic tests and alerts the nurse to possible misinterpretations of test results.

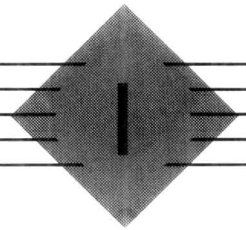
Drug Interactions Individual drugs, drug classes, and foods that interact with the drug under discussion are listed. Drugs may interact to inhibit or enhance one another; thus drug interactions may improve the therapeutic response, lead to therapeutic failure, or produce specific untoward reactions. Only drugs that have been shown to cause clinically significant interactions with the drug under discussion are listed.

Incompatibilities Solutions and drug additives physically incompatible with the drug under discussion are listed. Therefore these solutions and drug additives should not be mixed in solution with the drug.

Nursing Implications Nursing implications are listed under three headings: Administration, Assessment & Drug Effects, and Patient & Family Education. Before administering a drug, the nurse should read all three sections to determine (1) the appropriate administration techniques, (2) the assessments that should be made before and after administration of the drug and indicators of drug effectiveness, and (3) essential patient or family education related to the drug.

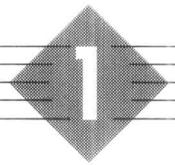
CONTENTS

SECTION



BASIC PHARMACOLOGY

CHAPTER



NURSE'S ROLE IN DRUG ADMINISTRATION

NURSING PROCESS APPLIED TO DRUG ADMINISTRATION

The nursing process is a formal, structured process that is used as a framework to guide patient care practices and drug administration in a wide variety of contemporary nursing practice settings. This process includes patient assessment, nursing diagnosis, planning, intervention, and evaluation.

In the *assessment* phase the nurse develops a client data base using information from both the personal history and the physical assessment. The nurse must pay particular attention to the history of past and current illness, the drugs used to treat those conditions, and the patient's response to those medications. Additionally the nurse must assess the patient's psychological response to the current diagnosis and social-cultural influences on the patient's compliance with drug therapy. For example, does the patient have access to a pharmacy and sufficient financial resources to fill prescriptions, or does the drug therapy threaten a cultural health care practice?

The *nursing diagnosis* is a statement that reflects the summary and analysis of available data, delineating the concern or problem area that nursing care can address. Nursing diagnosis statements reflect a variety of actual or potential concerns, and each problem or concern is addressed through a separate nursing diagnosis. Some commonly used nursing diagnoses related to medication administration are knowledge deficit, noncompliance, alterations in comfort, and ineffective coping.

The *planning* phase of the nursing process allows the nurse and the patient or family to jointly establish clear and specific goals. These goals should be measurable, as evidenced by specific behaviors: for example, the patient will be able to identify each of his or her cardiac medications and state the anticipated effects of each medication within 1 week.

The *intervention* phase of the nursing process includes correct and timely administration of medications, as well as the initiation of the teaching process to help the individual reach the set goals. Nurses must be creative teachers. They should assess the individual's learning style and design interventions to meet identified learning needs.

In the *evaluation* phase the nurse refers to the initial assessment and goals of care to determine whether the interventions resulted in attainment of the goals. For example, in evaluating the outcome of drug teaching, the nurse should ascertain the patient's understanding of

correct dosage, administration techniques, and reportable adverse effects.

THERAPEUTIC AIM OF DRUG THERAPY

The aim of drug therapy is to modify an existing physiological function. The most common mechanisms by which drugs act to modify physiological functions fall into the following categories: replacing a function (for example, insulin), enhancing a function (for example, bronchodilation with theophylline), impeding a function (for example, decreasing heart rate and blood pressure with propranolol), destroying tissues (for example, chemotherapy with radioactive iodine), and destroying an infection or infestation (for example, destroying bacterial infection with penicillin).

MAJOR DRUG CLASSIFICATIONS AND PROTOTYPES

Learning the actions, interactions, doses, and adverse effects of hundreds of drugs would be nearly impossible. Fortunately, therapeutic agents are classified into a number of different types based on similar therapeutic action or mechanism of action. The classifications in this book are based on the Pharmacologic-Therapeutic Classification of the American Hospital Formulary Service (AHFS). For each of these drug classifications, prototypes can be identified that are representative of the entire class of drugs. If the actions of the prototype drug can be learned, the characteristics of the other drugs in that class may be inferred. Learning about the prototype provides a basic framework on which to build a further understanding of the similarities and dissimilarities of the drugs in a class.

MEDICATION ORDERS

Components of a Legal Medication Order

Nurses administer medications in accordance with the physician's orders. The essential components of a legal medication order include the following:

1. Date on an outpatient prescription; date and time on an inpatient order.
2. Patient name for an outpatient; patient identification number for an inpatient.
3. Drug name (generic or trade) and strength of dose.
4. Frequency of dose and duration of therapy, if applicable. It is assumed that a medication ordered in a hospital is to be administered continuously until otherwise specified or until the order expires according to hospital policy.
5. Physician's full signature, with the physician's name printed below if the signature is illegible. Outpatient prescriptions should have the physician's state licensing number and Drug Enforcement Administration (DEA) identification number.
6. Outpatient prescriptions also have sections for specifying number of refills permitted.

In summary, the essential parts of the legal medication order include the clear delineation of patient name, name of drug, dose of drug, frequency and duration of administration, physician's signature, and date of the order being written. The nurse is legally responsible for interpreting each of these components before administering the drug. This information directs the nurse in the calculation, preparation, and administration of the medication. If the nurse cannot read the physician's orders or if the order seems erroneous, he or she must question the order before giving the drug. When in doubt, the nurse should call the physician who ordered the drug for clarification.

Generic and Trade Names

All drugs may be identified by both generic and trade names. The generic, or nonproprietary, name derives from the chemical substance from which the drug is made. This name has been approved by the Food and Drug Administration (FDA). The trade, or proprietary, name of a drug is the name a particular pharmaceutical company has chosen to market its version of the drug. If a physician wants a particular trade name drug dispensed, the words "dispense as written" should appear on the prescription.

Not all forms of a drug may have the same effective rate of absorption (referred to as bioavailability). When the generic drug has a low solubility or a high proportion of inert ingredients to active drug content, it may have a lower bioavailability than another manufacturer's product. When a patient complains that a medication doesn't work anymore, the reason may be that a generic formulation has been substituted that has a lower bioavailability for that individual.

Scheduled and prn Medication

Scheduled medications are to be administered at set intervals within a 24-hour period. Orders for these medications indicate the frequency as number of times in a day or specified times during the day. Abbreviations commonly used in prescriptions include the following:

a.c. = before meals	q = every
b.i.d. = twice a day	q.d. = every day
h = hour	q.i.d. = four times a day
h.s. = hour of sleep	q.o.d. = every other day
p.c. = after meals	s = second
prn = as necessary	t.i.d. = three times a day

An order for a drug to be given every 6 hours or q6h may not reflect the same drug administration times as a drug ordered q.i.d. which asks that the drug be administered four times in a day. The nurse has the responsibility to clarify an order with a physician if the nurse believes that a different dosing schedule would be more beneficial. For example, a diuretic ordered on a b.i.d. schedule may be given late enough in the evening to cause the patient to awaken from sleep to void. In consultation with the physician the nurse may administer the last dose earlier, thus eliminating the necessity for the patient to void during the night.

A prn order refers to a medication that may be given as circumstances indicate or as needed. The nurse is given some latitude in interpreting the patient's status when deciding when to give the medication. The types of medication most frequently ordered prn are analgesics, antiemetics, and laxatives. The guidelines for prn orders are the same as those for scheduled drugs but may have a range of doses and times of administration. For example, a patient may have an order for meperidine 50 to 100 mg IM q4–6h. The nursing assessment determines when and at what dose prn drugs are administered.

Stat Orders

A stat order is one that should be executed immediately. Drugs ordered in this manner should receive the utmost priority. Stat drugs often have the effect of modifying a serious physiological response, and delay in administration could jeopardize the patient. Common clinical examples include stat antihypertensives for a patient with extremely high blood pressure and stat nitroglycerin for a patient experiencing severe chest pain. Stat drugs are often administered by the intravenous route so that the drug reaches its target site quickly. Administration of a stat medication should be followed by frequent assessment and evaluation to determine if the desired effect has been achieved.

NURSES' LEGAL RESPONSIBILITIES

"Five Rights" of Medical Administration

At all times the nurse is legally responsible for correctly administering medication to the pa-

tients in the nurse's care. The legal responsibilities of the nurse are often summarized in the five rights of medication administration:

1. *Right Patient:* Always double-check the patient's name band. The nurse cannot assume that a patient answering in the affirmative when a name is called really is the stated person.
2. *Right Drug:* Check both drug name and correctness of therapy. Many medications have similar sounding names or spelling, for example, Zantac and Xanax, cefotaxime and ceftazidime.
3. *Right Route:* Ask if the drug should be given by this route, how else this drug can be given, and whether this is the correct route for this patient.
4. *Right Time:* Ask if this is the correct time for administration and when the last dose was given. Confirm that the schedule for drug doses is consistent with maintaining therapeutic levels and minimizing toxicity. Consider any physiological factors (for example, advanced age, hepatic disease) that could alter the dose or dosing schedule.
5. *Right Dose:* Ask what the recommended dose for this drug is, if this dose is appropriate for this patient, and whether there are laboratory results or therapeutic serum levels that could alter the drug dose.

Documentation of Medication Administration

Correct and complete documentation is an imperative step in the cycle of drug administration. Documentation includes the precise time of administration, the initials of the nurse responsible for administration, and the site of administration for parenteral doses. The nurse's full signature and title should be recorded on the medication administration record for that date and shift. Correct documentation in medication records can improve patient care. For example, it can ensure that a patient does not receive several intramuscular injections of pain medication in the same site.

COMMON MEDICATION ERRORS

The most common medication errors stem from inadequate attention to the five rights of medication administration. Common errors include the following:

1. *Wrong patient:* Administering a medication to the roommate of the intended patient because of inattentiveness to patient identification armbands.
2. *Wrong drug:* Picking a medication that appears to be the needed medication without double checking the actual name of the drug. For example, NPH insulin is administered when the order specifies regular insulin.
3. *Wrong route:* A common error with regard to route is the misadministration of an unusual oral form of a drug. For example, a chewable tablet is handed to the patient, who swallows it whole, or conversely a sustained action form of a medication is chewed or crushed.
4. *Wrong time:* Errors in timing of medication most commonly occur when a patient receives most of his or her medication at the same time of the day but has one scheduled at a different time. A possible error is that all medications are given at the same time or the one individually scheduled is inadvertently overlooked.
5. *Wrong dose:* An error in dose calculation may be due to a calculation error or to inattentiveness to unit dose medications (for example, a 25 mg dose is given in lieu of a 12.5 mg dose). If unsure of the drug dose calculation, the nurse should have colleagues verify the calculation.

Other common errors of medication administration include not verifying an illegibly written order and incorrectly transcribing a medication order given over the telephone.

WITHHOLDING ORDERED MEDICATIONS

Medications may be withheld for a variety of reasons. The nurse caring for the patient is responsible for conveying to the physician and other health care workers the reason for withholding the ordered drug. Patients may refuse their medications; the drug may be on a temporary hold awaiting a test, or parameters may be set describing when to hold a given medication, such as a specific blood pressure or heart rate. Each institution has its own method of documenting a withheld drug. The nurse must be aware of situations that require his or her clinical judgment to withhold a medication pending notification of the physician caring for the patient. Frequently the decision to delay or hold a medication is based on the nurse's physical assessment or interpretation of some laboratory data. Many medications require close assessment and monitoring of laboratory data to evaluate the effectiveness of the therapy. The nurse is responsible for knowing which drugs require additional laboratory data as a basis for clinical judgment.

CONTROLLED SUBSTANCES

The Controlled Substance Act of 1970 provides legal control of addictive and habituating drugs by both the Food and Drug Administration (FDA) and the Drug Enforcement Agency (DEA). Nurses must be aware of the implications for nursing practice regarding the classification for these drugs and the requirements for documentation and storage of the drugs. The five levels of classification (schedules 1 through V) are listed in Appendix A. Pharmacists are required to label controlled drugs by placing the letter "C" and the Roman numeral for the schedule in the upper right corner of the prescription blank.

NEEDED DRUG INFORMATION

The nurse who is faced with an order for the administration of an unfamiliar drug is legally responsible for developing an understanding of the medication in question. Beyond developing familiarity with the drug, the nurse must be able to translate available data into appropriate teaching for the patient for whom the drug is intended.

Actions/Pharmacodynamics and Uses

When evaluating information regarding a new drug, the nurse should compare the data describing the action (pharmacodynamics) of the drug within the body (see Chapter 5), as well as clinical descriptions of when it is used or indicated, with the clinical situation of the patient. The nurse should evaluate if this is indeed the correct drug for this patient and this condition.

Labeled vs Unlabeled Indications Drug indications listed in the manufacturer's package insert are often referred to as "FDA-approved" or simply "approved" indications or uses. However, drugs are often used appropriately for indications not listed in the manufacturer's package insert. These are best referred to as "unlabeled" indications.

FDA-approved indications are based on data supplied by the manufacturer demonstrating that adequate and well-controlled trials support these uses and that the drug is documented to be safe and effective at the time it is marketed. Only FDA-approved indications will be found in references such as the *Physicians' Desk Reference (PDR)*.

The FDA does not approve or disapprove of how a drug is used by a physician once the drug is marketed. An unlabeled indication may or may not be appropriate or rational, depending on accepted medical practice and reports in the medical literature. The physician uses professional judgment in assessing the potential ef-