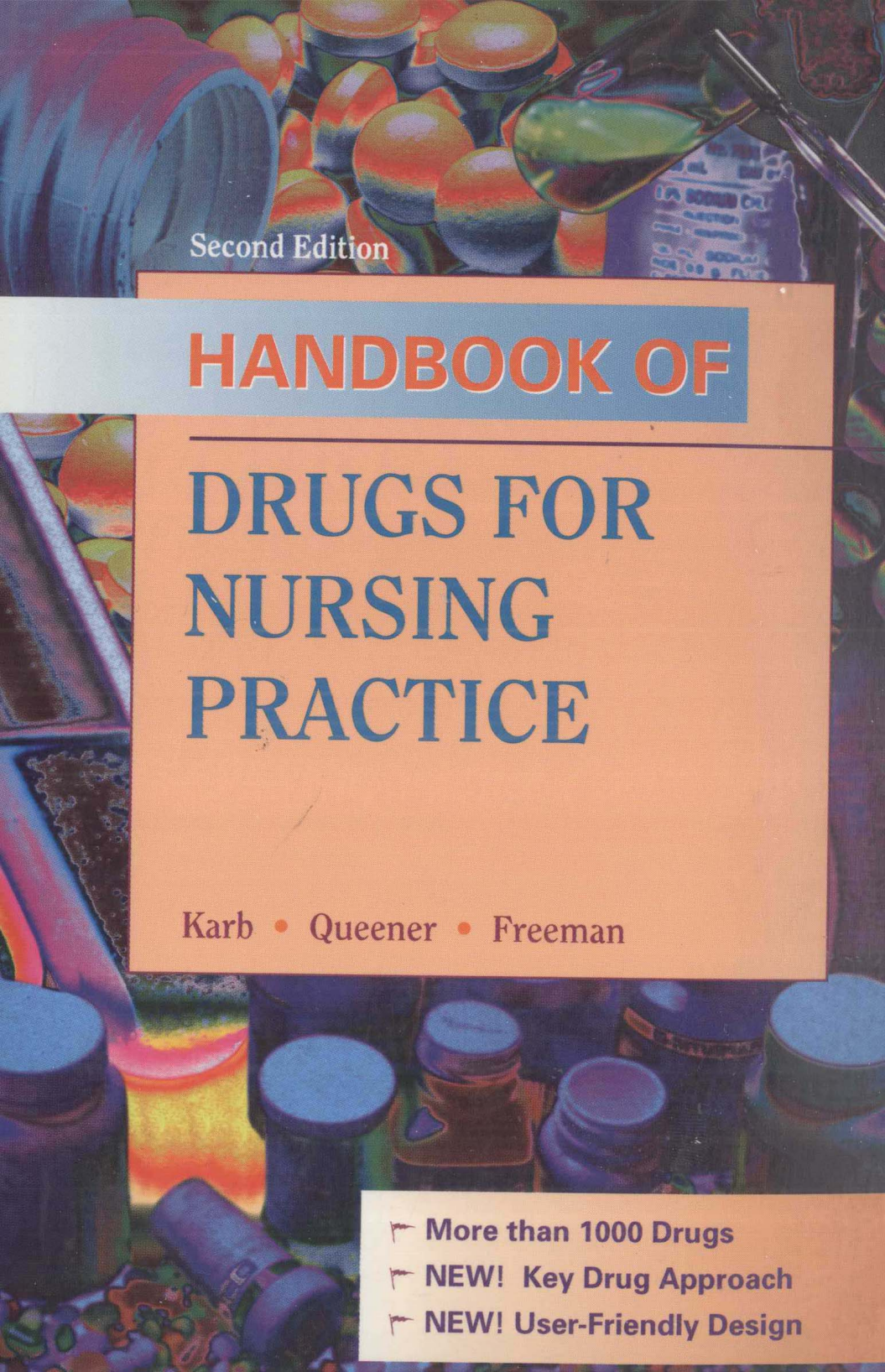

Second Edition

HANDBOOK OF DRUGS FOR NURSING PRACTICE

Karb • Queener • Freeman

- More than 1000 Drugs
- NEW! Key Drug Approach
- NEW! User-Friendly Design

HANDBOOK *of* DRUGS

For Nursing Practice

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A NOTE TO THE READER:
The author and publisher have made every attempt to check dosages and nursing content for accuracy. Because the science of pharmacology is continually advancing, our knowledge base continues to expand. Therefore we recommend that the reader always check product information for changes in dosage or administration before administering any medication. This is particularly important with new or rarely used drugs.

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Preface

Handbook of Drugs for Nursing Practice is designed to meet the special needs of clinical instructors, students, practicing nurses, and nurses in retraining.

A new, two-column drug monograph format and a more portable size enhance utility and portability. The book is organized into 13 units that group chapters covering drugs with related clinical applications. To orient the user to the class of drugs covered, each chapter starts with a list of drugs and a brief overview. Every chapter includes at least one entry highlighted with this symbol KEY DRUG for a key, or prototype drug. The key drug entry includes an expanded discussion of both pharmacology and nursing topics. The entries for other drugs in the class are abbreviated but complete. Symbols for pediatric ★ and geriatric ❂ considerations and for contraindications ⊘ highlight important life span and life-threatening information. These features help nurses and students focus on the most important drugs within a class and the most important information within each drug entry or monograph.

The logical presentation of the nursing process is helpful in relating the pharmacology content to clinical activities. Patient and family teaching are emphasized. Clear guidance is given for involving the patient and the patient's family in the care plan. In this way clinical response, including expected or unusual side effects, may be evaluated more quickly, and adjustments can be made.

The needs of both students and clinicians were carefully considered while creating this revision. The consistent format and clear writing style of each drug monograph makes information readily accessible. Each drug entry is independent, eliminating the need to refer to cross-references. The designation of side effects (most common side effects are in small capital letters and life threatening side effects requiring emergency/immediate attention are in bold type) helps nurses and students focus on the most pertinent information. A tab key for each unit allows immediate access to specific units. A detailed index that includes names of generic, trade, and combination products contributes to the accessibility of specific information within chapters. Each drug entry contains up-to-date information on dosages and precautions for use of drugs in special patients, such as pregnant patients, the very old or the very young, and in patients with significant liver or kidney failure. FDA pregnancy categories are listed for all drugs, when available.

Finally, nurses in retraining will find this handbook especially well suited to their special needs. Related drugs are covered in one place. Thus a nurse who has been out of the field for several years can quickly find the old, familiar drugs alongside the newer agents of the same type. This comparison, which is difficult with an alphabetically arranged handbook, helps the nurse in retraining move quickly to a degree of familiarity with the new by building on the old.

The authors express thanks to the editors and associates at Mosby–Year Book, Inc., who have worked with us in the redesign and execution of the *Handbook of Drugs for Nursing Practice:* Robin Carter, Gina Wright, Christine Carroll, and Sheilah Barrett. Thanks also to Dr. H. R. Besch, Jr., Chairman of Pharmacology and Toxicology at Indiana University School of Medicine, and Dr. Lynne G. Pearcey, Dean of the University of North Carolina Greensboro School of Nursing, for their support of this educational enterprise. Our thanks also to the colleagues who read, reviewed, critiqued, and strengthened our manuscript. These include the following professionals:

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Our goal in writing this handbook has been to put concrete and relevant drug information in the most useful form possible. As experienced teachers, we understand the process of learning and teaching, and we hope with this volume to have put a useful tool into the hands of the teacher, the student, and the practicing nurse. Your comments have been most helpful in the revision of this handbook. We welcome your comments on the second edition of *Handbook of Drugs for Nursing Practice* so that we may continually improve future editions.

V.B.K.
S.F.Q.
J.B.F.

How to Use This Book

The goal of this revision has been to develop an accurate, thorough, easy-to-use handbook for the student as well as the experienced nurse. Drugs are presented in units by category (e.g., cardiovascular drugs) and organized by chapters covering a drug class (e.g., ACE inhibitors). Within each drug class, drugs are listed alphabetically. The following features have been incorporated to accomplish this goal.

CHAPTER FORMAT

A standardized format is used for all chapters. Each chapter starts with a list of drugs, the page numbers, and a key drug. A brief overview explains the therapeutic role of each class of drugs.

DRUG FORMAT

Each drug entry is complete, so that no referral to other entries is necessary. Information on each drug is presented in the following order.

Generic Name

The official generic name of the drug is given, accompanied by a **pronunciation guide.**

FDA Pregnancy Category

The FDA pregnancy category is displayed prominently in the first line of each drug entry, when the drug has been classified.

Trade Names

Common trade names are listed for all forms of the drug available (e.g., different salt forms or combinations with other drugs). An OTC designation indicates an over-the-counter drug; no designation is given for prescription drugs. Drugs covered by the Federal Controlled Substances Act are designated by the schedule under which they fall: C-II, C-III, or C-IV. **Canadian trade names** are also listed; names unique to Canada are also marked.

Mechanism of Action

How the drug works in the body is explained, along with pertinent biochemistry or physiology background. The class to which the drug belongs is also identified.

Uses

A list of major therapeutic uses of the drug is presented, with a brief rationale where needed.

Contraindications

Conditions that indicate the drug should be avoided are listed, with a brief rationale as needed.

Precautions

Conditions are listed that suggest the drug should be used at reduced dosages or with extra vigilance for specific side effects.

Dosage
Doses are presented in the following sequence:
- Class of patient (e.g., Adult, Child, Elderly, Organ failure)
- Route (e.g., IM, IV, PO, SC)
- Amount (e.g., mg, g, U)
- Frequency of dose (e.g., q4h, q12h, q24h)

Preparations
The forms under which the drug is sold (e.g., tablets, capsules, etc.) and the amount of drug in those forms are listed. If information about the stability or storage of the drug is different, it is mentioned here. Syringe incompatibilities are noted when applicable. If the drug is also marketed in a combination form, that is noted.

Interactions
Includes information when appropriate for drug-to-drug, drug-to-food, and lab test interactions.

Pharmacokinetics
Includes the onset of action, time to peak effects, duration of action, distribution, and elimination.

Side Effects
Side effects are listed under the specific organ system showing the effect (e.g., CNS, CV, eye, GI, blood, liver, lung, metabolic, peripheral nerves, renal, skin).

Overdose
When appropriate, signs of frank overdose are listed along with antidotes or treatments.

Nursing Considerations
This material is presented in a consistent order that clarifies the nursing process. The format is as follows:
- *Assess* (e.g., what data should the nurse obtain or review initially)
- *Lab data* (data that the nurse should monitor is highlighted)
- *Implement* (e.g., what active interventions should the nurse perform in administering the medication safely)
- *Teach patient and family* (e.g., what must the nurse do to enable the patient and family to assume appropriate responsibility for the patient's continuing well-being, usually in the home setting)
- *Evaluate* (e.g., what the nurse should monitor as expected outcomes of therapy with this medication)

KEY DRUG APPROACH

Major drugs in each chapter are highlighted with a special icon KEY DRUG, on the individual monograph and in the list of drugs preceding each chapter, to help nurses and students focus on important drugs within drug classifications.

ALPHABETICAL ORGANIZATION

Within each chapter the individual drug monographs are listed alphabetically to promote facility in finding important information.

APPENDIXES

Five appendixes cover the following: medication administration (with illustrations), drug calculations: common methods, nomogram for calculation of body surface area, FDA pregnancy categories, controlled substance chart.

DESIGN

The number of units has been minimized to better utilize **tabs.** This system allows the user to locate a unit quickly. **Icons** for pediatric ★ and geriatric ❂ considerations, key drugs KEY DRUG, and contraindications ⊘ help the reader find critical information quickly. A new, **two-column drug monograph format** with a **more portable trim size** is convenient in the classroom and clinical settings.

Contents

UNIT 1

CARDIOVASCULAR DRUGS

Chapter 1

Angiotensin-converting Enzyme Inhibitors

OVERVIEW

Angiotensin-converting enzyme (ACE) inhibitors are important in the treatment of chronic hypertension, and some are used in the treatment of congestive heart failure. The ACE inhibitors cause vasodilation indirectly by inhibiting angiotensin I from forming angiotensin II. Angiotensin II is a potent vasopressor important in the regulation of blood pressure by the renin-angiotensin system.

benazepril

(ben A ze pril)
FDA pregnancy category C: first trimester
FDA pregnancy category D: second and third trimesters
benazepril hydrochloride: Lotensin

Mechanism of Action

Vasodilation results from reduction in the potent vasoconstrictor angiotensin II when ACE is inhibited. Benazepril is a prodrug and is deesterified in the liver to the active form, benazeprilat.

Uses

Chronic hypertension.

Contraindications

Angioedema; renal function impairment; renal transplant; hyperkalemia; dialysis or severe dietary sodium restriction; hepatic function impairment.

Precautions

Benazepril and benazeprilat both cross the ★ placenta and are excreted in breast milk. Neonates and infants may be at risk for oliguria and neurologic abnormalities. Hepatic impairment reduces formation of benazeprilat. Marked hypotensive response with initial dose, especially when added to diuretic therapy.

Dosage

Adult: *Antihypertensive—PO:* 10 mg q24h initially; 20-40 mg q24h or 10-20 mg q12h maintenance; *maximum daily dose:* 80 mg. Reduce by half with impaired renal clearance (creatinine clearance below 30 ml/min).

Preparations
Benazepril hydrochloride tablets 5, 10, 20, 40 mg.

Interactions
Drug: Additive hypotensive effects with alcohol, diuretics, other drugs with hypotensive effects such as phenothiazines, MAO inhibitors, benzodiazepines used as preanesthetics. Hyperkalemia with blood from a blood bank, potassium-sparing diuretics, potassium supplements, salt substitutes, low-salt milk. NSAIDs may antagonize antihypertensive effect.
Lab tests: Renal imaging with iodohippurate sodium or technetium may be inaccurate. Serum alkaline phosphatase, bilirubin, serum transaminases, BUN, serum creatinine, potassium may be increased; ANA may become positive.

Pharmacokinetics
GI absorption; very high protein binding; converted in liver to active form of the drug, benazeprilat; onset in 1 hr; peak effect in 2-4 hours; duration 24 hours; renal elimination.

Side effects
CNS: Headache.
CV: Hypotension.
GI: Nausea, diarrhea.
Respiratory: Chronic nonproductive cough, especially in women.
Blood: **Hyperkalemia, neutropenia, agranulocytosis.**
Allergic: **Angioedema,** skin rash with or without itching, fever, joint pain.
Metabolic: **Pancreatitis.**

Overdose
Severe hypotension: treat with volume expansion.

NURSING CONSIDERATIONS

Assess
★ • BP, heart rate. Children especially sensitive to hypotensive effects. Monitor BP frequently when starting therapy and during dosage adjustment.
• In patients with CHF: respiratory rate, lung sounds, dependent edema, jugular venous distention, weight.

Lab data: Electrolytes, especially potassium. Renal function tests: BUN, serum creatinine. Liver function tests. WBC and differential; hematocrit and hemoglobin.

Implement
• Reduce dosage in dehydrated or sodium-depleted patients.

Teach Patient and Family
• Symptoms of orthostatic hypotension: dizziness, light-headedness, syncope. Treatment: Move slowly from lying to sitting or standing; sit or lie down if symptoms develop. Avoid hot baths, showers. May be aggravated by alcohol ingestion, hot weather, exercise followed by rest or immobility. Avoid driving and operating hazardous equipment if dizzy.
• Importance of all concomitant therapies: weight loss, sodium restriction, smoking cessation, caffeine restriction, regular exercise, other medications.
• Avoid other medications that may cause hypotension unless approved by physician: barbiturates, CNS depressants; OTC drugs for colds, asthma, weight loss, sinus trouble (may contain sympathomimetics, which raise blood pressure), diuretics.
• Avoid salt substitutes and low-salt milk unless approved by physician (may be high in potassium).
• Avoid dehydration: Report nausea, vomiting, diarrhea to physician; stay well hydrated during hot weather.
• Missed dose: Take when remembered, unless within 8 hours of next scheduled dose; then omit. Do not double up missed doses.
• Not to discontinue drug abruptly or without consulting physician; hypertension is usually chronic, and treatment must be ongoing for best effect.
• Avoid use of alcohol unless first discussed with physician.

- Report development of rash.
- Metallic taste in the mouth may develop and contribute to weight loss; monitor weight. Check with physician about changing drugs or dose.
- Report signs of infection, sore throat, fever (signs of agranulocytosis).

Evaluate
- Desired therapeutic effect: drop in blood pressure.

captopril (KEY DRUG)
(KAP toe pril)
FDA pregnancy category C: first trimester
FDA pregnancy category D: second and third trimesters
captopril: Capoten*
captopril and hydrochlorothiazide: Capozide

Mechanism of Action
Vasodilation results from reduction in the potent vasoconstrictor angiotensin II when ACE is inhibited.

Uses
Chronic hypertension; congestive heart failure; diabetic renal disease; prophylaxis immediately after myocardial infarction to reduce risk of death.

⊘ *Contraindications*
Angioedema; renal function impairment; renal transplant; hyperkalemia; dialysis or severe dietary sodium restriction; hepatic function impairment.

Precautions
★ Captopril crosses the placenta and is excreted in small amounts in breast milk. Neonates and infants may be at risk for oliguria and neurologic abnormalities. Marked hypotensive response with initial dose, especially when added to diuretic therapy.

Dosage
Adult: *Antihypertensive—PO:* 12.5 mg q12h or q8h initially; 25 mg q12h or q8h maintenance if necessary. *For congestive heart failure—PO:* 12.5 mg q12h or q8h initially; 50 mg q12h or q8h if necessary. *For diabetic renal disease—PO:* 50 mg q12h; *maximum adult dose:* 450 mg.
Child: *PO:* 300 µg/kg q8h initially; increase by 300 µ as necessary. ★
Newborns: *PO:* 10 µg/kg q8h. ★

Preparations
Captopril tablets 12.5, 25, 50, 100 mg.

Interactions
Drug: Additive hypotensive effects with alcohol, diuretics, other drugs with hypotensive effects such as phenothiazines, MAO inhibitors, benzodiazepines used as preanesthetics. Hyperkalemia with blood from a blood bank, potassium-sparing diuretics, potassium supplements, salt substitutes, low-salt milk. NSAIDs may antagonize antihypertensive effect.
Lab tests: Renal imaging with iodohippurate sodium or technetium possibly inaccurate; Increased serum alkaline phosphatase, bilirubin, serum transaminases, BUN, serum creatinine, potassium; positive ANA; positive urinary acetone.

Pharmacokinetics
GI absorption; onset in 15-60 min; peak effect in 30-60 min; duration 6-12 hours; renal elimination.

Side Effects
CNS: Headache.
CV: Hypotension.
GI: TASTE DISTURBANCE, nausea, diarrhea.
Respiratory: Chronic nonproductive cough, especially in women.
Blood: **Hyperkalemia, neutropenia, agranulocytosis.**
Allergic: **Angioedema,** MACULOPAPULAR SKIN RASH, WITH OR WITHOUT ITCHING, FEVER, OR JOINT PAIN (FIRST MONTH OF THERAPY).

Renal: Proteinuria (high-dose therapy).
Metabolic: **Pancreatitis.**

Overdose
Severe hypotension: treat with volume expansion; captopril is removable by hemodialysis.

NURSING CONSIDERATIONS

Assess
★ • Blood pressure, heart rate. Children especially sensitive to hypotensive effects. Monitor BP frequently when starting therapy and of dosage adjustment.
- In patients with CHF: respiratory rate, lung sounds, dependent edema, jugular venous distension, weight.
- Urine protein; check first morning specimen with dipstick before initiating therapy. Monitor urine protein periodically in patients with renal function impairment or doses of captopril greater than 150 mg.

Lab data: Electrolytes, especially potassium. Renal function tests: BUN, serum creatinine. Liver function tests. WBC and differential; hematocrit and hemoglobin.

Implement
- Administer on empty stomach 1 hour before meals.
- Reduce dosage in dehydrated or sodium-depleted patients.
- Tablets may have a slightly sulfurous odor.
- Oral solution can be made by crushing a 25-mg tablet, dissolving in 25 or 100 ml water, shaking well for 5 min. Discard filler, which does not dissolve. Administer solution. Must administer within 30 min of preparation. Call pharmacy with questions.

Teach Patient and Family
- Symptoms of orthostatic hypotension: dizziness, light-headedness, syncope. Treatment: Move slowly from lying to sitting or standing; sit or lie down if symptoms develop. Avoid hot baths, showers. May be aggravated by alcohol ingestion, hot weather, exercise followed by rest or immobility. Avoid driving and operating hazardous equipment if dizzy.
- Importance of all concomitant therapies: weight loss, sodium restriction, smoking cessation, caffeine restriction, regular exercise, other medications.
- Avoid other medications that may cause hypotension unless approved by physician: barbiturates, CNS depressants; OTC drugs for colds, asthma, weight loss, sinus trouble (may contain sympathomimetics, which raise blood pressure), diuretics.
- Avoid salt substitutes and low-salt milk unless approved by physician (may be high in potassium).
- Avoid dehydration: Report nausea, vomiting, diarrhea to physician; stay well hydrated during hot weather.
- Missed dose: Take when remembered, unless within 4 hours of next scheduled dose; then omit. Do not double up missed doses.
- Not to discontinue drug abruptly or without consulting physician. Hypertension is usually chronic, and treatment must be ongoing for best effect.
- Avoid use of alcohol unless first discussed with physician.
- Report development of rash.
- Development of metallic taste in the mouth may contribute to weight loss; monitor weight.
- Report signs of infection, sore throat, fever (signs of agranulocytosis).

Evaluate
- Desired therapeutic effect: drop in blood pressure. Improvement in CHF: decreased BP, slower respiratory rate, improvement in rales; weight loss.

enalapril
(e NAL a pril)
FDA pregnancy category C: first trimester
FDA pregnancy category D: second and third trimesters
enalapril maleate: Vasotec*
enalapril and hydrochlorothiazide: Vaseretic
enalaprilat injection: Vasotec*

Mechanism of Action
Vasodilation results from reduction in the potent vasoconstrictor angiotensin II when ACE is inhibited. Enalapril is a prodrug and is deesterified in the liver to the active form, enalaprilat.

Uses
Chronic hypertension; congestive heart failure.

Contraindications
Angioedema; renal function impairment; renal transplant; hyperkalemia; dialysis or severe dietary sodium restriction; hepatic function impairment.

Precautions
Enalapril crosses the placenta. Hepatic impairment reduces formation of enalaprilat. Marked hypotensive response with initial dose, especially when added to diuretic therapy.

Dosage
Adult: *Antihypertensive—PO:* mg q24h initially; 10-40 mg q24h or 5-20 mg q12h maintenance. Reduce by half if given with diuretics or when renal clearance impaired (creatinine clearance below 30 ml/min). *For congestive heart failure—PO:* 2.5 mg q24h initially, 5-20 mg q24h maintenance.

Preparations
Enalapril maleate tablets 2.5, 5, 10, 20 mg. Enalaprilat injection 1.25 mg/ml. Store at room temp; dilutions stable for 24 hours.

Interactions
Drug: Additive hypotensive effects with alcohol, diuretics, other drugs with hypotensive effects such as phenothiazines, MAO inhibitors, benzodiazepines used as preanesthetics. Hyperkalemia with blood from a blood bank, potassium-sparing diuretics, potassium supplements, salt-substitutes, low-salt milk; NSAIDs may antagonize antihypertensive effect.
Lab tests: Renal imaging with iodohippurate sodium or technetium may be inaccurate. Serum alkaline phosphatase, bilirubin, serum transaminases, BUN, serum creatinine, potassium may be increased; ANA may become positive.

Pharmacokinetics
GI absorption; moderate protein binding; converted in liver to active form of the drug, enalaprilat; onset in 1 hour (15 min enalaprilat); peak effect in 4-6 hours, (1-4 hour for enalaprilat); duration 24 hours (6 hours for enalaprilat); renal and fecal excretion.

Side Effects
CNS: Headache.
CV: Hypotension.
GI: Nausea, diarrhea.
Respiratory: Chronic nonproductive cough, especially in women.
Blood: **Hyperkalemia, neutropenia, agranulocytosis.**
Allergic: **Angioedema,** skin rash with or without itching, fever, or joint pain.
Metabolic: **Pancreatitis.**

Overdose
Severe hypotension: treat with volume expansion; enalaprilat is removable by hemodialysis.

NURSING CONSIDERATIONS

Assess
- Blood pressure, heart rate. Children especially sensitive to hypotensive effects. Monitor BP frequently when starting therapy and during dosage adjustment. ★