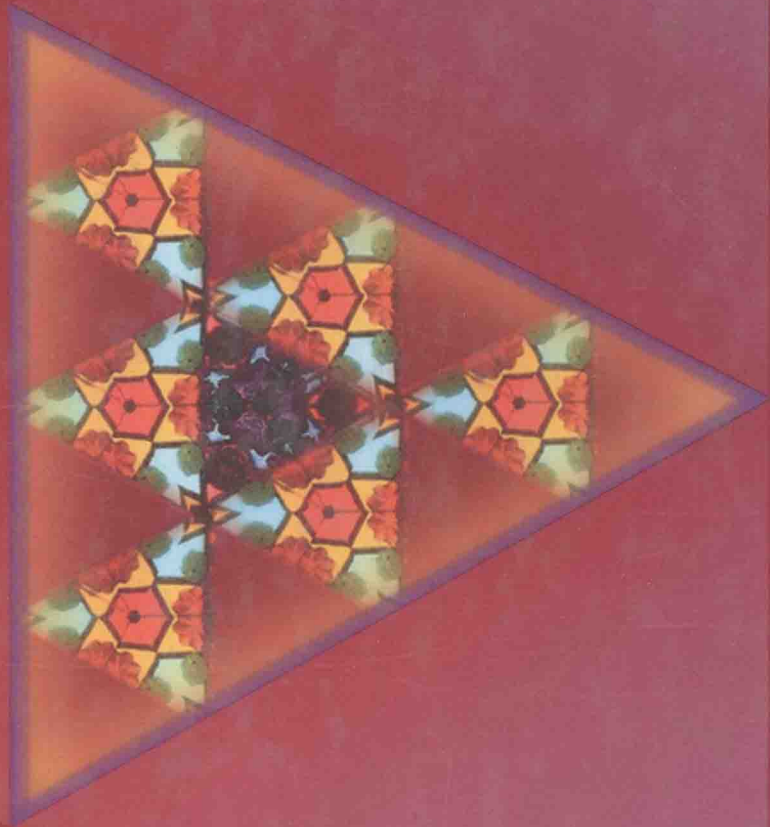


Brunner and Suddarth's Textbook of
MEDICAL-SURGICAL
NURSING

Eighth Edition



Suzanne C. Smeltzer
Brenda G. Bare

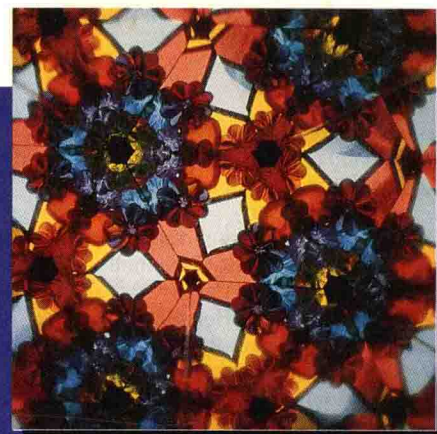
Lippincott

FREE
Disk Inside!

BRUNNER AND SUDDARTH'S

Textbook of Medical-Surgical Nursing

EIGHTH
EDITION



Suzanne C. Smeltzer, RN, EdD, FAAN

Associate Professor and Nurse Researcher
Thomas Jefferson University
Philadelphia, Pennsylvania

Brenda G. Bare, RN, MSN

Assistant Vice President for Nursing
The Alexandria Hospital
Alexandria, Virginia

With 41 Contributors

Sponsoring Editor: Lisa Stead
Coordinating Editorial Assistants: Sarah Andrus and Brian MacDonald
Project Editor: Tom Gibbons
Indexer: Ann Cassar
Art Director: Susan Hermansen
Interior Designer: Anne O'Donnell
Cover Designer: Jerry Cable
Production Manager: Helen Ewan
Production Coordinator: Kathryn Rule
Compositor: Compset Inc.
Printer/Binder: R.R. Donnelly & Sons Company/Willard
Cover Printer: The Lehigh Press, Inc.

8th Edition

Copyright © 1996 by Lippincott-Raven Publishers.

Copyright © 1992, 1988, 1984, 1980, 1975, 1970, 1964 by J. B. Lippincott Company. All rights reserved. No part of this book may be used or reproduced in any manner whatsoever without written permission except for brief quotations embodied in critical articles and reviews. Printed in the United States of America. For information write Lippincott-Raven Publishers, 227 East Washington Square, Philadelphia, Pennsylvania 19106.

6 5 4 3 2 1

Library of Congress Cataloging-in-Publication Data

Brunner and Suddarth's textbook of medical-surgical nursing.—8th ed. / [edited by] Suzanne C. Smeltzer, Brenda G. Bare ; with 41 contributors.

p. cm.

Includes bibliographical references and index.

ISBN 0-397-55073-1

1. Nursing. 2. Surgical nursing. I. Brunner, Lillian Sholtis.
II. Suddarth, Doris Smith. III. Smeltzer, Suzanne C. O'Connell.
IV. Bare, Brenda G. V. Title: Textbook of medical-surgical nursing.
[DNLM: 1. Nursing Care. 2. Surgical Nursing. WY 150 B8972 1995]

RT41.T46 1995

610.73—dc20

DNLM/DLC

for Library of Congress

95-2835

CIP

The material contained in this volume was submitted as previously unpublished material, except in the instances in which credit has been given to the source from which some of the illustrative material was derived.

Any procedure or practice described in this book should be applied by the health-care practitioner under appropriate supervision in accordance with professional standards of care used with regard to the unique circumstances that apply in each practice situation. Care has been taken to confirm the accuracy of information presented and to describe generally accepted practices. However, the authors, editors, and publisher cannot accept any responsibility for errors or omissions or for any consequences from application of the information in this book and make no warranty, express or implied, with respect to the contents of the book.

The authors and publisher have exerted every effort to ensure that drug selection and dosage set forth in this text are in accordance with current recommendations and practice at the time of publication. However, in view of ongoing research, changes in government regulations, and the constant flow of information relating to drug therapy and drug reactions, the reader is urged to check the package insert for each drug for any change in indications and dosage and for added warnings and precautions. This is particularly important when the recommended agent is a new or infrequently employed drug.

Materials appearing in this book prepared by individuals as part of their official duties as U.S. Government employees are not covered by the above-mentioned copyright.

To Lillian Sholtis Brunner and Doris Smith Suddarth

With appreciation for the many years you have helped
countless nursing students and practitioners in the art and science of nursing



Contributors

Margaret Ahearn-Spera, R.N., C., M.S.N.

Director, Medical Patient Care Services
Danbury Hospital
Danbury, Connecticut
Assistant Clinical Professor
Yale University School of Nursing
New Haven, Connecticut

Chapter 60: Management of Patients With Neurologic Disorders

Daleen Aragon, R.N., M.S.N., C.C.R.N.

Education Specialist, ICU
Orlando Regional Health Care System
Orlando, Florida

Chapter 56: Assessment and Management of Patients With Vision Problems and Eye Disorders

Debra A. Bancroft, R.N., B.S.N.

Speciality Coordinator, Rheumatology
Columbia Hospital
Milwaukee, Wisconsin

Chapter 52: Management of Patients With Rheumatic Disorders

Linda J. Burns, Ph.D., R.N.

Assistant Professor, College of Nursing
Seton Hall University
South Orange, New Jersey

Chapter 19: Preoperative Nursing Management

Chapter 20: Intraoperative Nursing and Anesthesia

Chapter 21: Postoperative Nursing Management

Jacqueline Fowler Byers, R.N., M.S.N., C.C.R.N.

Director of Nursing Research
Orlando Regional Health Care System
Orlando, Florida

Chapter 55: Management of Patients With Burn Injury

Patricia Ann Cady, Ph.D., R.N., C.C.R.N.

Clinical Nurse III, Surgical Intensive Care Unit
Beth Israel Hospital
Boston, Massachusetts

Chapter 5: Ethical Issues in Medical-Surgical Nursing

Corinne Lewis Conlon, M.S.N., R.N., C.S.

Assistant Professor
Piedmont Virginia Community College
Charlottesville, Virginia

Chapter 32: Assessment and Management of Patients With Hematologic Disorders

Juliet Corbin, R.N., D.N.S.

Lecturer, School of Nursing
San Jose State University
San Jose, California

Chapter 17: Chronic Illness

Ann Dellaira, Ph.D., R.N., C.

Assistant Professor, Department of Nursing
Faculty of Arts and Sciences, Rutgers University
Camden, New Jersey

Chapter 48: Assessment of Immune Function

Chapter 49: Management of Patients With Immunodeficiency Disorders

Chapter 50: Acquired Immunodeficiency Syndrome

Chapter 51: Management of Patients With Allergic Disorders

Gladys E. Deters, R.N., M.S.N., O.C.N.

Associate Professor
University of Virginia School of Nursing
Charlottesville, Virginia

Chapter 53: Assessment of Integumentary Function

Chapter 54: Management of Patients With Dermatologic Problems

Nancy Donegan, R.N., M.P.H., C.I.C.

Director, Infection Control
Washington Hospital Center
Washington, D.C.

Chapter 65: Management of Patients With Infectious Diseases

Karen Hassey Dow, R.N., Ph.D., F.A.A.N.

Assistant Professor
University of Central Florida
Orlando, Florida

Chapter 46: Assessment and Management of Patients With Breast Disorders

Barbara Springer Edwards, R.N., C.C.R.N., M.T.S.

Acting Director, Cardiac Surgical Unit
The Alexandria Hospital
Alexandria, Virginia
Ethical Issues Displays

Kathleen Keller Furniss, R.N., C., M.S.N.

Women's Health Care Nurse Practitioner
University of Medicine and Dentistry of New Jersey
Newark, New Jersey

Chapter 44: Assessment and Management of Patients With Problems Related to Female Physiologic Processes

Chapter 45: Management of Patients With Disorders of the Female Reproductive System

Chapter 46: Assessment and Management of Patients With Breast Disorders

Maureen Giuffre, R.N., Ph.D.

Clinical Research Consultant
Salisbury, Maryland

Chapter 13: Pain Management

Janet Goshorn

Clinical Educator
Florida Hospital
Orlando, Florida

Chapter 43: Management of Patients With Urinary and Renal Disorders

Doreen Chaffinch Grzelak, M.S.N., R.N., O.C.N.

Director Medical/Oncology Nursing
Reston Hospital Center
Reston, Virginia

Chapter 34: Management of Patients With Ingestive Problems and Upper Gastrointestinal Disorders

Chapter 36: Management of Patients With Gastric and Duodenal Disorders

Gail P. Hamilton, R.N., C., D.S.W.

Associate Professor
Department of Nursing, College of Allied Health Professions
Temple University
Philadelphia, Pennsylvania
Chapter 12: Health Care of the Older Adult

Lois M. Hoskins, Ph.D., R.N., F.A.A.N.

Associate Professor
The Catholic University of America
Washington, D.C.
Chapter 8: Homeostasis and Pathophysiologic Processes
Chapter 9: Stress and Adaptation

Ann N. Hotter, R.N., M.S.N., C.C.R.N.

Clinical Nurse Specialist—Critical Care
Mayo Foundation Hospitals
Assistant Professor of Nursing
Mayo Medical School
Rochester, Minnesota
Chapter 25: Respiratory Care Modalities

Ryan Iwamoto, R.N., C.S., M.N.

Clinical Nurse Specialist—Radiation Oncology
Virginia Mason Medical Center
Seattle, Washington
Chapter 47: Assessment and Management of Patients With Disorders of the Male Reproductive System

Ann Robicheau Kaisen, R.N., B.S.N., M.P.A.

Nursing Education Specialist
Yale–New Haven Hospital
New Haven, Connecticut
Chapter 26: Assessment of Cardiovascular Function

Dorothy B. Liddel, M.S.N., R.N., O.N.C.

Assistant Professor
Columbia Union College
Takoma Park, Maryland
Chapter 18: Principles and Practices of Rehabilitation
Chapter 61: Assessment of Musculoskeletal Function
Chapter 62: Management Modalities for Patients With Musculoskeletal Dysfunction
Chapter 63: Management of Patients With Musculoskeletal Disorders
Chapter 64: Management of Patients With Musculoskeletal Trauma

Martha V. Manning, R.N., M.S.N.

Milieu Nurse Specialist
Commonwealth Day Treatment Program
Fairfax, Virginia
Chapter 33: Assessment of Digestive and Gastrointestinal Function
Chapter 37: Management of Patients With Intestinal and Rectal Disorders

Barbara J. Maschak-Carey, R.N., C.S., M.S.N., C.D.E.

Diabetes Clinical Nurse Specialist
Hospital of the University of Pennsylvania
Philadelphia, Pennsylvania
Chapter 39: Assessment and Management of Patients With Diabetes Mellitus

Shawn M. McCabe, R.N., M.S.N., C.C.R.N.

Clinical Nurse Specialist, Trauma
University of Medicine and Dentistry of New Jersey
Newark, New Jersey
Chapter 58: Assessment of Neurologic Function
Chapter 59: Management of Patients With Neurologic Dysfunction

Kathleen Miller, R.N., M.B.A., M.S.N.

Assistant Vice President Nursing and Support Services
The Alexandria Hospital
Alexandria, Virginia
Chapter 66: Emergency Nursing

Kathleen Collins Monahan, R.N., M.S.N.

Nursing Consultant
Formerly of Yale–New Haven Hospital
New Haven, Connecticut
Chapter 26: Assessment of Cardiovascular Function

Nancy A. Morrissey, Ph.D., R.N., C.

Director, Surgical Unit
The Alexandria Hospital
Alexandria, Virginia
Chapter 35: Gastrointestinal Intubation and Special Nutritional Management

Martha Mulvey, R.N., M.S., C.N.S.

Clinical Nurse Specialist—Surgery
University Hospital, University of Medicine and Dentistry of New Jersey
Newark, New Jersey
Chapter 14: Fluids and Electrolytes: Balance and Disturbances

Catherine Paradiso, R.N., C.C.R.N., M.S.N.

Clinical Nurse Specialist
Mobile Health Unit Coordinator
The Visiting Nurse Association
Home Care of Staten Island
Staten Island, New York
Chapter 41: Assessment of Urinary and Renal Function
Chapter 42: Management of Patients With Urinary and Renal Dysfunction

Anne G. Peach, R.N., M.S.N., C.N.A.

Site Administrator, Sand Lake Hospital
Orlando Regional Health Care System
Orlando, Florida
Chapter 22: Assessment of Respiratory Function
Chapter 23: Management of Patients With Conditions of the Upper Respiratory Tract
Chapter 24: Management of Patients With Conditions of the Chest and Lower Respiratory Tract

Janice Smith Pigg, B.S.N., R.N., M.S.

Nurse Consultant, Rheumatology
Columbia Musculoskeletal Center, Columbia Hospital
Milwaukee, Wisconsin
Chapter 52: Management of Patients With Rheumatic Disorders

Kimberly J. Pollock, R.N., B.S.N., M.B.A., C.O.R.L.N.

Administrator, Department of Otorhinolaryngology
University of Texas Southwest Medical Center
Dallas, Texas
Chapter 57: Assessment and Management of Patients With Hearing Problems and Ear Disorders

Kathryn A. Pollon, R.N., M.S.N., C.S.

Mental Health Therapist
Northwest Center for Community Mental Health
Chantilly, Virginia
Chapter 10: Human Response to Illness

Linda Robinson, M.S.N., R.N., C.S.

Doctoral Candidate
University of Pennsylvania School of Nursing
Philadelphia, Pennsylvania
Chapter 15: Shock and Multisystem Failure

Susan Rokita, R.N., M.S.

Clinical Nurse Specialist—Adult Oncology
University Hospital, Pennsylvania State University
Hershey, Pennsylvania
Chapter 16: Oncology: Nursing the Patient With Cancer

**Linda H. Schakenbach, M.S.N., R.N., C.C.R.N.,
C.E.T.N., C.S.**

Clinical Nurse Specialist, Surgical Nursing
Fairfax Hospital
Fairfax, Virginia
Chapter 28: Management of Patients With Cardiac Disorders and Related Complications
Chapter 29: Management of Patients With Structural, Infectious, or Inflammatory Cardiac Disorders
Chapter 30: Management of the Cardiac Surgery Patient

Loretta Spittle, R.N., M.S., C.C.R.N.

Staff Nurse, MICU
Georgetown University Hospital
Washington, D.C.
Chapter 27: Management of Patients With Dysrhythmias and Conduction Problems
Chapter 28: Management of Patients With Cardiac Disorders and Related Complications
Chapter 29: Management of Patients With Structural, Infectious, or Inflammatory Cardiac Disorders

Cindy Stern, R.N., M.S.N.

Clinical Research Associate
Thomas Jefferson University Hospital
Philadelphia, Pennsylvania
Chapter 16: Oncology: Nursing the Patient With Cancer

Judith Troyer-Caudle, R.N., M.S.N.

Vascular and Wound Clinical Nurse Specialist
Veterans' Affairs Medical Center
Kansas City, Missouri
Chapter 31: Assessment and Management of Patients With Vascular Disorders and Problems of Peripheral Circulation



Reviewers

Kathy M. Howard, R.N., C., M.S.N.
Standard Maintenance Representative
Medical-Surgical Adult Health Division
Newark Beth Israel Medical Center
Newark, New Jersey

Joan Klemballa, R.N., M.A., Ph.D.
Professor of Nursing
The College of West Virginia
Beckley, West Virginia

Cathy Mallone, R.N., B.S.N., M.S.N.
Assistant Professor
University of North Alabama
Florence, Alabama

Dorothy Obester, Ph.D., M.S.N., B.S.N.E., R.N.
Professor of Nursing
Saint Francis College
Loretta, Pennsylvania

Katherine Dentoni Ricossa, B.S.N., R.N., C., Ph.N.
Associate Faculty
Mission Community College
Santa Clara, California
Staff Nurse III, Surgical Orthopedic Neurosurgical
Department
Good Samaritan Hospital
San Jose, California



Preface

As the end of the 20th century approaches, the health care system and nursing, as an integral part of that system, are entering a new era characterized by heretofore unknown challenges. With health care shifting from the acute care hospital to community-based settings and the home in an effort to reduce costs of health care, the profession of nursing and nurses are faced with the need to respond to an array of demands and changes.

The “graying of America” reflects the aging of the population and an increasing incidence of chronic illnesses among the patients in our care. The ethnic and cultural characteristics of patients, clients, and health care providers alike are becoming more diverse. The beliefs and values of nurses that health and health care are important and that people have a vital role in maintaining their own health may conflict with the beliefs and values of other cultures. The problem of homelessness in individuals and whole families creates a challenge and dilemma to the nurse whose goal for patients is optimal health and well-being. It creates a dilemma for nurses who take for granted the availability of shelter, food, and clothing.

Acute care hospitals promote discharge of patients as early as possible because of financial losses incurred if patients are hospitalized beyond the number of days for which the hospital receives reimbursement. At the same time, nurses must consider the well-being of patients as their families reorganize their lives so they can assume care for the patient who is discharged within days of major surgery or acute illness. The need to discharge patients from the hospital while they are in the very early stages of recovery creates challenges for the nurse who must teach the patient and family about detection, prevention, and management of complications that previously were attended to during hospitalization. The need to begin discharge planning often before the patient is hospitalized for surgery requires new approaches to planning and implementing interventions to ensure the patient’s recovery and well-being.

As nurses deal with these changes in the health care system, they are also called upon to respond to changes related to technologic and scientific advances in health care. Examples of these changes include the discovery of new genetic markers that provide information about a patient’s likelihood of developing potentially fatal or disabling diseases in the future and advanced technologies and therapeutic regimens that enable the survival of those who previously would have succumbed to their illness or injury. As these changes are occurring, patients are taking on an increasingly active role in decision making about their own health care. Patients are urged to consider advanced directives and to make known their opinions and wishes about their own care.

Although the value of nurses’ contributions to patient care has been acknowledged in the past, the need for

nurses to take an active, more visible role in influencing health-related social policy at the local and national levels is becoming increasingly important because of the relationship between social issues, such as violence and drug abuse, and health. The proliferation of other categories of health care providers makes it imperative that nurses effectively articulate the contributions of nursing to health promotion and maintenance, disease prevention, and patient and family well-being. A voice at the table of decision-making about health policy and health-related social issues is critical if nursing as a profession is to thrive.

The changes and challenges described above make it essential that the nurse is knowledgeable about the problems faced by patients and their families during and following hospitalization and has well-developed critical-thinking skills that will allow examination of issues encountered in the course of providing care in the hospital, outpatient clinic, nursing center, community setting, and home. An understanding of the influences of culture and ethnicity on the patient and an ability to identify and analyze ethical issues in nursing practice are essential if the nurse is to provide the high-quality care that the public expects.

This edition of *Brunner and Suddarth’s Textbook of Medical-Surgical Nursing* was written with today’s changing health care system as a key focus.

Organization

The book is divided into 17 units, dealing with various aspects of health care and the physiologic disorders that constitute the essence of medical-surgical nursing.

Unit 1 addresses broad general issues in the current health care scene and in nursing education. Chapters in this unit deal with such topics as Health Care Delivery and Nursing Practice; Community-Based Nursing Practice; Critical Thinking and the Nursing Process; Health Teaching and Health Promotion; and Ethical Issues in Medical-Surgical Nursing.

Unit 2 describes the components of health assessment, including approaches to Clinical Interviewing and Physical Examination and Nutritional Assessment.

Unit 3 examines a range of biophysical and psychosocial concepts and includes chapters on Homeostasis and Pathophysiology; Stress and Adaptation; Human Response to Illness; Transcultural Perspectives in Nursing; and Health Care of the Older Adult.

Unit 4, Concepts and Challenges in Patient Management, addresses the topics of Pain Management; Fluids and Electrolytes; Shock and Multisystem Failure; Oncology; Chronic Illness; and Rehabilitation.

Unit 5 on Perioperative Concepts and Management provides the student with the general principles involved in preoperative, intraoperative, and postoperative management. Individual chapters address each of these stages of perioperative nursing.

Units 6 to 16 focus on specific areas of human physiologic function and the dysfunctions associated with each of the major body systems. The areas covered include Oxygen–Carbon Dioxide Exchange and Respiratory Function; Cardiovascular, Circulatory, and Hematologic Function; Digestive and Gastrointestinal Function; Metabolic and Endocrine Function; Urinary and Renal Function; Reproductive Function; Immunologic Function; Integumentary Function; Sensorineural Function; Neurologic Function; and Musculoskeletal Function. Each body system unit includes chapters on assessment, general management and therapeutic interventions, and specific physiologic disorders and problems.

Unit 17, the last unit, deals with the acute problems of Infectious Diseases and Emergency Nursing.

New to This Edition

As expected with a new edition, the chapters throughout the book have been thoroughly reviewed and updated to ensure that the material reflects current information and developments.

- *New chapters* have been added to address the pressing issues and new concepts mentioned earlier in the Preface:
Chapter 2: Community-Based Nursing Practice
Chapter 3: Critical Thinking and the Nursing Process
Chapter 11: Transcultural Perspectives in Nursing
Chapter 15: Shock and Multisystem Failure
Chapter 17: Chronic Illness
Chapter 50: Acquired Immunodeficiency Syndrome
- *New elements* to this edition include collaborative problems; examples of critical pathways; special charts and boxed displays on patient education, prevention, and health promotion guidelines; ethical decision-making situations; procedural guidelines; and critical thinking exercises at the end of each chapter. Each of these elements and other features are described in more detail in the following paragraphs.
- *Full color* has been introduced into this edition to provide a richer visual impact and to highlight the illustrations as well as the various display elements, charts, and tables.
- *A clinical handbook*, covering the major disorders encountered in medical-surgical nursing practice, accompanies this edition. The information is presented in outline format and offers the student a portable, easy-to-use clinical reference.

Critical Thinking Emphasis

Nurses have traditionally drawn on their critical thinking skills in providing nursing care. However, with the changing health care scene, nurses are working in more diverse settings and with more independence; thus, the need to develop critical thinking skills early in the education process

has become even more important. The text and its accompanying learning package provide several means for helping students develop and refine these essential thinking skills:

- Chapter 3, “Critical Thinking and the Nursing Process,” offers a general discussion of critical thinking along with specific guidelines for developing these skills. The student can thus obtain a solid overview of methods for applying critical thinking in the clinical setting.
- *Critical Thinking Exercises* at the end of each chapter provide the student with specific situations in which to apply thinking skills. Classroom discussion of students’ responses to these exercises can provide a forum for exploring the different thinking processes involved in dealing with these situations.
- *The Study Guide* that accompanies the text contains additional critical thinking exercises and situations to further help students develop and refine their cognitive skills.
- A *computer disc* enclosed at the back of the book provides a self-testing medium for the student and offers the rationale for decision-making responses. Continued use of this computer program will enhance the student’s ability to think critically.

Transcultural Awareness

The rich and varied cultural texture of our society requires a sensitive and open-minded approach in the delivery of health care. The text has attempted to increase an awareness of methods for caring for people from varied ethnic and cultural backgrounds:

- Chapter 11, “Transcultural Perspectives in Nursing,” is devoted to this subject and offers specific guidelines and considerations in dealing with ethnic and cultural diversity in the health care setting.
- The *Critical Thinking Exercises* at the end of each chapter contain numerous instances of cultural diversity to reinforce this important consideration in nursing practice.

Special Features

- *Nursing Process*: The nursing process continues to be the focus for discussing the delivery of nursing care. As in previous editions, it is presented in a consistent format for most of the major disorders covered in the text. Assessment, Diagnosis (Nursing Diagnoses and Collaborative Problems), Planning and Implementation, Nursing Interventions, and Evaluation with Expected Outcomes represent the major framework for discussing the nursing process.
- *Collaborative Problems*: Since working collaboratively with other members of the health care team represents an essential nursing responsibility, collaborative problems have been incorporated into the nursing process framework as part of assessment and monitoring activities and as an important component of nursing interventions.
- *Critical Pathways*: Selected examples of critical pathways are included. These depict the manner in which

cost containment goals based on DRGs have prompted hospitals to construct clinical management tools that delineate the daily collaborative activities that must be carried out within a set time frame to achieve identifiable patient outcomes.

- *Care Plans:* As in past editions, numerous care plans abound throughout the text and are based on the nursing process. Whereas critical pathways present broad-based collaborative activity involved in patient care, the nursing care plans delineate the specific nursing interventions to be carried out in delivering effective nursing care to achieve the desired patient outcomes.
- *Patient Education Charts and Prevention and Health Promotion Guidelines:* These charts and boxed displays underscore the importance of health promotion and preventive care as a key component of nursing practice. They highlight specific points related to guiding patients in promoting their health, preventing illness and carrying out self-care activity while recovering from specific illnesses.
- *Procedure Guidelines:* In selected instances when nursing care is based on procedural activity in a medical-surgical setting, the steps involved in carrying out the procedure are presented in chart form for easy access.
- *Home Care Considerations:* With so many patients being discharged early in the course of their recovery, home care and patient teaching have gained increasing importance in the delivery of health care. The activities involved in carrying out or overseeing care in the home, either through home care visits by the nurse or through family and patient teaching, are delineated for a wide range of disorders and are clearly highlighted under specific headings in the text. This specific information augments the general guidelines for home care delivery discussed in Chapter 2, "Community-Based Nursing Practice."
- *Gerontologic Considerations:* The increasing number of elderly people in our society requires that special attention be directed to the care of this segment of the population. Therefore, the text continues to include a special heading for discussing gerontologic considerations throughout the clinical chapters and devotes a full chapter to this topic: Chapter 12, "Health Care of the Older Adult."
- *Research Profiles:* The results of nursing research continue to influence nursing care. This edition retains the extremely popular Nursing Research Profile feature that appears at the end of the clinical units. These profiles contain a collection of key current research studies related to selected main topics covered in the unit. The student is thus given an overview of the diverse nature of the research that has been conducted and can gain an awareness and appreciation of the importance of such research to nursing practice.
- *Chapter Outlines and Learning Objectives:* The outlines and objectives that appear at the beginning of each chapter help orient the reader to the content of the chapter. The outlines identify the organizational elements within the chapter. The learning objectives alert the reader to the key concepts and points to be gained from studying the chapter.

• *Bold-Face Type:* Key terms are presented in bold face when first introduced in the chapter to highlight the words and definitions and alert the reader to their importance.

Teaching/Learning Package

The teaching/learning package that accompanies this edition of *Brunner and Suddarth's Textbook of Medical-Surgical Nursing* contains items for both the student and the instructor. For the student there is a study guide, a computer program for self-evaluation, and a clinical handbook. For the instructor there is a computerized testbank, a printed testbank, an instructor's manual, and a set of overhead transparencies.

For the Student

- *The Study Guide* is structured to follow the chapter sequence of the text and offers a variety of different types of questions to help students evaluate their grasp of the contents of the text. Critical thinking questions and case studies provide an opportunity to apply higher-level cognitive skills.
- A *Computer Disc* inserted at the back of the text offers further practice in evaluating knowledge and thinking skills. Students are offered different modes for self-evaluation and are provided with rationale to explain the appropriateness of their responses.
- A *Clinical Handbook* to cover the most frequent disorders encountered in medical-surgical nursing accompanies this edition. An alphabetical organization and an outline format provide an easy-to-use reference for the clinical setting.

For the Instructor

- A *Computerized Testbank*, based on the ParTEST program, consists of 1000 new questions for this edition and is available free to instructors upon adoption of the text. ParTEST is a sophisticated program that allows instructors to edit the questions in the testbank or add new questions, if so desired.
- A *Printed Testbank*, consisting of the questions in the computerized testbank, is available to enable instructors to see the questions for a particular chapter or unit at a glance.
- *Instructor's Manual*
- *Overhead Transparencies*

The eighth edition of *Brunner and Suddarth's Textbook of Medical-Surgical Nursing* is designed to address current issues and to promote the skills necessary in today's changing health care system. Chronicity, home care, and gerontologic considerations have received special emphasis because of their increasing importance in our society. This textbook, which retains the focus on the caring values that have characterized previous editions and prepares the nurse for the beginning of the 21st century, and the educational materials that have been developed to accompany it are designed to assist students and their faculty to respond to the changing health care environment.

Suzanne C. O'Connell Smeltzer
Brenda G. Bare



Acknowledgments

The authors and publisher wish to thank the following people for their hard work and dedication to this project:

Diane M. Billings, R.N., B.S.N., M.S.Ed.

Associate Professor
Indiana University School of Nursing
Indianapolis, Indiana

Mary Jo Boyer, R.N., D.N.Sc.

Associate Dean
Allied Health and Nursing
Delaware County Community College
Media, Pennsylvania

Curtis Buck, C.R.N.A., R.R.T.

Director, Respiratory Therapy
Mayo Foundation Hospitals
Rochester, Minnesota

Kathleen M. Bury, R.N.

Coordinator, IV Services
The Alexandria Hospital
Alexandria, Virginia

Randi Cardonick, M.S., R.D.

Out-Patient Dietician
Hospital of the University of Pennsylvania
Philadelphia, Pennsylvania

Dolly Daniel, R.N., B.S.N.

Diabetes Nurse Educator
The Alexandria Hospital
Alexandria, Virginia

Douglas Gracey, M.D.

Consultant in Pulmonary and Critical Care Medicine
Mayo Clinic
Rochester, Minnesota

Tracey B. Hopkins, R.N., A.D.N.

The Graduate Hospital
Philadelphia, Pennsylvania

Diana Intenzo

Editor

Gary Koenig, R.N.

Nurse Coordinator for Pulmonary Ventilator Respiratory Unit
Mayo Foundation Hospitals
Rochester, Minnesota

Nina S. McClesky, M.L.S.

Director, Medical Library
The Alexandria Hospital
Alexandria, Virginia

Norma M. Metheny, Ph.D., R.N., F.A.A.N.

Professor of Nursing
St. Louis University School of Nursing
St. Louis, Missouri

William L. Meyerhoff, M.D., Ph.D.

Professor and Chairman
Department of Otorhinolaryngology
University of Texas Southwest Medical Center
Dallas, Texas

Margaret Rafferty, R.N., M.A., M.P.H.C.S., N.P.

Associate Professor
Long Island College Hospital School of Nursing
Brooklyn, New York

Carol S. Rosenberg, M.S.N., R.N., C.D.E.

Diabetes Clinical Nurse Specialist
Bay Shores Medical Group
Torrence, California

Ronald K. Smeltzer, Ph.D.

P. Dee G. Stephenson, M.D.

Stephenson Eye Association
Venice, Florida

Elizabeth Sullivan

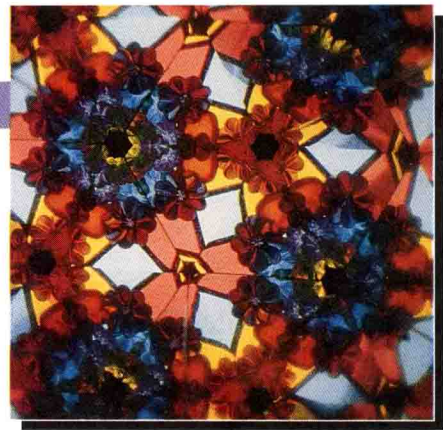
Manager of Clinical Outcomes
Hahnemann University Hospital
Philadelphia, Pennsylvania

Betty Temples-Mill, R.N., Ph.D.

Rose Wilcox, R.N., M.S.

Instruction Coordinator
Columbus Public Schools
Columbus, Ohio

Contents



UNIT 1

Health Maintenance and Health Needs 1

1 ■ Health Care Delivery and Nursing Practice 3

The Health Care Delivery System	4
Health and Health Promotion	4
The Changing Health Care Scene	4
Measures for Cost-Effective, Quality Care	5
Managed Health Care	7
Nursing and the Nursing Delivery System	8
Nursing Defined	8
Nursing Delivery Systems	8
Community-Based Nursing	9
The Patient/Client: Consumer and Recipient of Health Care	11
The Patient's Basic Needs	11
Cultural Diversity	11
Roles of the Nurse	12
Practitioner Role	12
Leadership Role	12
Research Role	12
Advanced Practice Nursing	12
Collaborative Practice	13

2 ■ Community-Based Nursing Practice 17

The Growing Need for Community-Based Health Care	18
Home Health Care	18
Hospital Versus Community-Based Nursing Care	19
Discharge Planning for Home Care	19
Community Resources and Referrals	19
Preparing for a Home Visit	20
Personal Safety Precautions	20
Conducting a Home Visit	20
Determining the Need for Future Visits	21
Closing the Visit	22
Other Community-Based Health Care Settings	22
Ambulatory Settings	22
Occupational Health Programs	22
School Health Programs	22
Care for the Homeless	23

3 ■ Critical Thinking and the Nursing Process 25

Critical Thinking	26
Aspects of Critical Thinking	26
Steps of the Nursing Process	27
Assessment	27
Health History	27
The Health Assessment	28

Other Components of the Data Base	28
Recording the Data Base	29
Diagnosis	30
Nursing Diagnosis	30
Collaborative Problems	31
Planning	31
Setting Priorities	31
Establishing Goals for Nursing Action	33
Establishing Expected Outcomes	33
Implementation	33
Recording Outcomes	34
Evaluation	36

4 ■ Health Education and Health Promotion 39

Health Education Today	40
The Purpose of Health Education	40
Adherence to the Therapeutic Regimen	40
Gerontologic Considerations	41
The Nature of Teaching and Learning	41
Learning Readiness	41
The Learning Atmosphere	42
Teaching Techniques	42
Gerontologic Considerations	43
The Nursing Process in Patient Teaching	43
Assessment	43
Nursing Diagnosis	43
Planning	43
Implementation	45
Evaluation	45
Health Promotion	45
Health and Wellness	45
Definition of Health Promotion	46
Health Promotion Principles	46
Health Promotion Throughout the Life Span	47
Children and Adolescents	47
Young and Middle-Aged Adults	48
Elderly Adults	48
Implications for Nursing	49

5 ■ Ethical Issues in Medical-Surgical Nursing 51

Definition of Ethical Terms	52
Ethics Versus Morality	52
Approaches to Ethics	52
Moral Situations	53
Classic Ethical Theories	53
Teleological Theory	54
Deontological Theory	54
Virtue Ethics	55
Ethical Pluralism	56

Domain of Nursing Ethics	56
Types of Ethical Problems in Nursing	56
Ethical Decision Making	59
Preventive Ethics	60
Advance Directives	61

UNIT 2

Health Assessment of the Client/ Patient 65

6 ■ Clinical Interviewing: The Health History 67

The Role of the Nurse	68
The Health History	68
Ethical Considerations in Data Collection	68
Basic Guidelines for the Interviewer	68
Reducing Anxiety	68
Encouraging Communication	69
Remaining Flexible	69
Conveying Empathy	69
Personal Awareness	70
Nonverbal Communication	70
Level of Understanding	70
Cultural Considerations	70
Summarizing the Interview	70
Content of the Interview	70
Biographical Data	71
The Informant	71
Chief Complaint	71
History of Present Illness	71
Health History	72
Family History	72
Review of Systems	72
Patient Profile	73
Gerontologic Considerations	76
Other Health History Formats	76

7 ■ Physical Assessment and Nutritional Assessment 79

The Physical Assessment	80
Assessment in the Home	80
The Process of Physical Examination	80
Inspection	80
Palpation	81
Percussion	82
Auscultation	82
The Nutritional Assessment	83
Anthropometric Measurements	84
Biochemical Assessment	85
Clinical Examination	86
Dietary Intake	86
Conducting the Interview	86
Cultural Considerations	87
Evaluating the Dietary Information	88
Factors Influencing Nutritional Status in Varied Settings	88
Analysis of Nutritional Status	88
Gerontologic Considerations	88

UNIT 3

Biophysical and Psychosocial Concepts 93

8 ■ Homeostasis and Pathophysiologic Processes 95

Dynamic Balance: The Steady State	96
-----------------------------------	----

Internal Constancy, Homeostasis, and Adaptation	96
Maintenance of the Steady State	96
Nursing Implications	97
Pathophysiologic Processes at the Cellular Level	97
Nature of Changes	97
Responses to Stimuli/Stressors	97
Nursing Implications	97
Control of the Steady State: Control Systems	98
Negative Feedback Process	98
Positive Feedback	98
Cellular Adaptation and Injury	98
Common Adaptations	98
Injury	99
Response to Injury: Inflammation	101
Cell Death	103
A Representative Pathophysiologic Process: Hypertensive Heart Disease	103
Mechanisms of Blood Pressure Regulation	103
Nursing Implications	104

9 ■ Stress and Adaptation 105

Stress and Adaptation Defined	106
Stress	106
Adaptation	106
Stressors: The Sources of Stress	106
Types of Stressors	106
Life Event Stressors	107
Time-Related Stressors	107
Mediating Processes	107
Appraisal and Coping	107
Coping With Illness	109
Physiologic Response	109
Interpretation of Stimuli by the Brain	109
Neuroendocrine Response	109
Stress and the Immune System	111
Selye and the General Adaptation Syndrome	111
Phases of the GAS	111
Local Adaptation Syndrome	111
Additional Views	112
Indicators of Stress	112
Maladaptive Responses	112
Models of Illness	113
Stress Management: Nursing Interventions	113
Internal Resources	114
External Resources	116

10 ■ Human Response to Illness 119

Stages of Illness	120
First Stage	120
Second Stage	120
Third Stage	121
Adapting to Illness	121
Basic Emotional Needs	121
Self-Image and Body Image	122
Emotional Reactions to Illness	123
Role Changes	127
Coping Strategies	128
Denial	128
Seeking Information	130
Requesting Emotional Support	130
Learning Self-Care	130
Setting Concrete, Limited Goals	130
Rehearsing Alternative Outcomes	130
Finding Meaning in Illness	130
Dying and Death	130
Stages of Dying	130
Tasks of Mourning	131

11 ■ Transcultural Perspectives in Nursing 133

- Definitions of Culture 134
 - Subcultures and Minorities 134
- Transcultural Nursing 134
- Culturally Competent Nursing Care 135
- Cultural Assessment 135
- Cross-Cultural Communication 135
 - Verbal Communication 135
- Cultural Awareness 136
 - Space and Distance 136
 - Eye Contact 137
 - Time 137
 - Touch 137
 - Observance of Holidays 137
 - Culture and Diet 137
- Causes of Illness 138
- Folk Healers 139
- The Future of Transcultural Nursing Care 140

12 ■ Health Care of the Older Adult 141

- Definitions 142
 - Old Age Defined 142
 - Life Span Versus Life Expectancy 142
- Profile of an Aging America 143
 - Health Status of the Elderly 143
- Psychosocial Aspects of Aging 143
 - Developmental Theories 144
 - Sociologic Theories of Aging 144
- Cognitive Aspects of Aging 145
 - Intelligence 145
 - Learning and Memory 145
- Normal Biologic Aging 146
 - Intrinsic Versus Extrinsic Aging 146
 - Age-Related Cellular, Tissue, and Organ Changes 146
- Age-Related Body System Changes: Health Promotion 146
 - Cardiovascular Changes 146
 - Respiratory Changes 148
 - Integumentary Changes 148
 - Reproductive Changes 149
 - Genitourinary Changes 149
 - Gastrointestinal Changes 149
 - Nutritional Health 150
 - Musculoskeletal Changes 150
 - Nervous System Changes 151
 - Sensory Changes 151
- Mental Health Disorders 152
 - Age-Related Stress and Coping Mechanisms 152
 - Affective Disorders 152
 - Organic Mental Disorders 154
 - Delirium 154
 - Dementia 156
- Alzheimer's Disease 156
 - Pathophysiology 156
 - Etiology 157
 - Diagnostic Evaluation 157
 - Clinical Manifestations 157
 - Nursing Interventions 158
- Multi-infarct Dementia 159
- Medications and the Elderly 165
 - Physiologic Considerations 165
 - Nursing Implications 166
 - Self-Administered Medications 167
- Chronic Illness and Common Disturbances of Well-Being 167
 - Urinary Incontinence 167
 - Fatigue 167
 - Headaches 167

- Back Pain 167
- Sleep Disturbances 167
- Heartburn and Indigestion 167
- Dyspnea 168
- Foot Problems 168
- The Older Person in the Community 168
 - Family 168
 - The Home Environment 168
- Community Programs and Health Services 169
 - Medicare and Medicaid 169
 - Home Care 169
- Ethical and Legal Issues 169
- The Older Adult in an Acute Care Setting: Altered Responses to Illness 170
 - Host Defenses: Susceptibility to Infectious Disease 170
 - Pain and Fever 169
 - Emotional Impact 171
 - Systemic Impact 171
- The Older Adult in a Protected Environment 171

NURSING RESEARCH PROFILE FOR UNIT 3 174**UNIT 4
Concepts and Challenges in Patient Management 177****13 ■ Pain Management 179**

- Definition of Pain 180
 - Acute Versus Chronic Pain 180
 - Harmful Effects of Pain 181
- Pain Perception 182
 - Neurophysiologic Mechanisms of Pain 182
- Nursing Assessment of Pain 184
 - Assessing Perception of Pain 184
 - Assessing Physiologic and Behavioral Responses to Pain 185
 - Factors Influencing the Pain Response 186
- Nursing Interventions 188
 - Identifying Goals for Pain Management 188
 - Nurse–Patient Relationship and Patient Teaching 188
 - Providing Physical Care 188
 - Managing Anxiety Related to Pain 188
- Pain Management Strategies 189
 - Pharmacologic Interventions 189
 - Nonpharmacologic Measures 196
- Patient Teaching: Care in the Home and Community 198
- Evaluating the Effectiveness of Pain Intervention Strategies 198

14 ■ Fluids and Electrolytes: Balance and Disturbances 205

- Fundamental Concepts 206
 - Amount and Composition of Body Fluids 206
 - Electrolytes 206
 - Regulation of Body Fluid Compartments 207
 - Routes of Gains and Losses 208
 - Laboratory Tests to Evaluate Fluid Status 208
 - Homeostatic Mechanisms 209
 - Gerontologic Considerations 211
- Fluid Volume Disturbances 211
 - Fluid Volume Deficit (Hypovolemia) 211
 - Fluid Volume Excess (Hypervolemia) 214
 - Gerontologic Considerations 216
- Sodium Imbalances 216
 - Sodium Deficit (Hyponatremia) 217
 - Sodium Excess (Hypernatremia) 218
- Potassium Imbalances 220

Potassium Deficit (Hypokalemia)	220
Potassium Excess (Hyperkalemia)	222
Calcium Imbalances	223
Calcium Deficit (Hypocalcemia)	224
Calcium Excess (Hypercalcemia)	225
Magnesium Imbalances	227
Magnesium Deficit (Hypomagnesemia)	227
Magnesium Excess (Hypermagnesemia)	228
Phosphorus Imbalances	229
Phosphorus Deficit (Hypophosphatemia)	229
Phosphorus Excess (Hyperphosphatemia)	230
Acid–Base Disturbances	230
Regulation of Acid–Base Balance	230
Metabolic Acidosis (Base Bicarbonate Deficit)	233
Metabolic Alkalosis (Base Bicarbonate Excess)	233
Respiratory Acidosis (Carbonic Acid Excess)	234
Respiratory Alkalosis (Carbonic Acid Deficit)	235
Mixed Acid–Base Disorders	235
Blood Gas Analysis	236
Parenteral Fluid Therapy	236
Purpose	236
Types of Intravenous Solutions	236
Nursing Management of the Patient Receiving Intravenous Therapy	238
Venipuncture	238
Monitoring Intravenous Therapy	241
Discontinuing an Infusion	241
Complications Associated With Parenteral Fluid Therapy	241

15 ■ Shock and Multisystem Failure 247

Definition of Shock	248
Classification of Shock	248
Pathophysiology of Shock	248
Cellular Effects of Shock	248
Vascular Responses	248
Blood Pressure Regulation	248
Overview of the Stages of Shock	249
Compensatory Stage	250
Progressive Stage	250
Irreversible Stage	252
Overview of Medical Management of Shock	253
Fluid Replacement in Shock	253
Vasoactive Medication Therapy in Shock	254
Nutritional Support in Shock	254
Management of Different Types of Shock	255
Hypovolemic Shock	255
Cardiogenic Shock	257
Distributive Shock	260
Multiple Organ Failure	263
Clinical Manifestations	263
Management	263

16 ■ Oncology: Nursing the Patient With Cancer 265

Incidence	266
Mortality Rates	266
Pathophysiology of the Malignant Process	266
Benign Versus Malignant Proliferative Patterns	266
Characteristics of Malignant Cells	268
Carcinogenesis	270
Etiology	270
The Role of the Immune System	271
Detection and Prevention of Cancer	272
Diagnosis of Cancer	273
Staging and Grading	273
Management of Cancer	274
Surgery	274
Radiation Therapy	277

Chemotherapy	280
Bone Marrow Transplantation	285
Hyperthermia	287
Photodynamic Therapy	287
Biologic Response Modifiers	287
Gene Therapy	289
Mental Imagery Techniques	289
Unproven/Unconventional Methods	289
Nursing Care of the Patient With Cancer	290
<i>Nursing Process: The Patient With Cancer</i>	290
Rehabilitation	297
Gerontologic Considerations	307
Patient Education and Home Care Considerations	308
Care of the Patient With Advanced Cancer	308
Hospice	309
Oncologic Emergencies	309
Superior Vena Cava Syndrome	309
Spinal Cord Compression	310
Hypercalcemia	310
Pericardial Effusion and Cardiac Tamponade	311
Disseminated Intravascular Coagulopathy	311
Syndrome of Inappropriate Secretion of Antidiuretic Hormone	312
Tumor Lysis Syndrome	313

17 ■ Chronic Illness 317

The Phenomenon of Chronic Illness	318
Definition of Chronic Illness	318
Causes of Chronic Illness	318
The Implications of Chronicity	319
The Problems of Managing Chronic Illness	320
Implications for Nursing	320
The Chronic Illness Trajectory Framework	321
Overview	321
Phases of Chronic Illness	321
Steps of the Trajectory Nursing Model	322
Patient Education and Home Care Considerations	323

18 ■ Principles and Practices of Rehabilitation 325

Philosophy of Rehabilitation	326
Gerontologic Considerations	326
Psychologic and Emotional Reactions to Disability	326
Coping With Fatigue	326
Sexuality Issues	327
The Rehabilitation Team	327
Assessment for Rehabilitation	327
<i>Nursing Process: Self-Care Deficit: Activities of Daily Living</i>	328
<i>Nursing Process: Impaired Physical Mobility</i>	329
<i>Nursing Process: Impaired Skin Integrity</i>	341
<i>Nursing Process: Altered Elimination Patterns: Urinary/Bowel</i>	347
Continuing Rehabilitation in the Home and Community	349
Americans With Disabilities Act	350

NURSING RESEARCH PROFILE FOR UNIT 4 353

UNIT 5

Perioperative Concepts and Management 355

19 ■ Preoperative Nursing Management 357

Perioperative Nursing	358
Gerontologic Considerations	358
Surgical Indications and Classifications	359
Nursing Process Overview	359
Psychosocial Nursing Assessment and Interventions	360

General Physical Assessment	361
Nutritional Status and Chemical Substance Use	361
Respiratory Status	363
Cardiovascular Status	363
Hepatic and Renal Function	363
Endocrine Function	363
Immunologic Function	363
Previous Medication Therapy	364
Gerontologic Considerations	364

Informed Consent	364
------------------	-----

Preoperative Patient Education	366
Deep Breathing, Coughing, and Relaxation Exercises	366
Turning and Active Body Movement	366
Pain Control and Medications	368
Cognitive Control	368
Other Information	368

Preoperative Nursing Interventions	368
Nutrition and Fluids	368
Intestinal Preparation	368
Preoperative Skin Preparation	369

Immediate Preoperative Nursing Interventions	369
Preanesthetic Medication: Pharmacokinetics	369
Preoperative Record	370
Transportation to the Presurgical Suite	370
Helping the Family Cope	371

20 ■ Intraoperative Nursing and Anesthesia 373

Intraoperative Nursing Functions	374
Principles of Health and Operating Room Attire	374
Principles of Perioperative Asepsis	375
Protocols	375
Basic Rules of Surgical Asepsis	376
The Patient Undergoing Anesthesia	376
The Patient and the Anesthesiologist	376
Gerontologic Considerations	377
Anesthesia: An Overview	378
General Anesthesia	378
Regional Anesthesia	380
Patient Position on the Operating Table	384
Induced Hypotension	385
Hypothermia	386
Malignant Hyperthermia During General Anesthesia	388
Intraoperative Nursing: The Nursing Process	389

21 ■ Postoperative Nursing Management 391

Transferring the Patient to the Postanesthesia Care Unit	392
Postanesthesia Care Unit	392
Immediate Postoperative Assessment	392
Nursing Interventions	394
Postanesthesia Care Unit Criteria and Scoring Guide	395
Patient's Reception and Care on the Clinical Unit	395
<i>Nursing Process: Caring for the Postoperative Patient</i>	396
Postoperative Complications	403
Shock	404
Hemorrhage	405
Deep Venous Thrombosis (DVT)	405
Pulmonary Embolism	407
Respiratory Complications	407
Urinary Retention	408
Gastrointestinal Complications	409
Postoperative Psychosis	409
Gerontologic Considerations	410
Ambulatory Surgery	411
Types of Ambulatory Surgery Procedures	411
Patient Selection	411
Preoperative and Postoperative Care	411
Care of the Surgical Incision/Wound	412

Wound Classification	412
Physiology of Wound Healing	413
Dressings	417
Wound Complications	418

NURSING RESEARCH PROFILE FOR UNIT 5 425

UNIT 6

Oxygen–Carbon Dioxide Exchange and Respiratory Function 427

22 ■ Assessment of Respiratory Function 429

Anatomy of the Upper Respiratory Airway	430
Nose	430
Paranasal Sinuses	430
Turbinate Bones (Conchae)	430
Pharynx, Tonsils, and Adenoids	430
Larynx	430
Assessment of the Upper Respiratory Airway	431
Nose and Sinuses	431
Pharynx	431
Trachea	432
Diagnostic Studies	432
Physiologic Overview of Respiration	432
Anatomy of the Lung	433
Mechanics of Ventilation	434
Diffusion and Perfusion	436
Gas Exchange	438
Oxygen Transport	438
Oxyhemoglobin Dissociation Curve	439
Carbon Dioxide Transport	440
Neurologic Control of Ventilation	440
Gerontologic Considerations	440
Assessment of Patients With Pulmonary Disorders	440
History	440
Examination of the Thorax	441
Assessment of Respiratory Signs and Symptoms	448
Dyspnea	449
Cough	449
Sputum Production	449
Chest Pain	450
Wheezing	450
Clubbing of the Fingers	450
Hemoptysis	450
Cyanosis	451
Assessment of Breathing Ability	451
Respiratory Rate	451
Tidal Volume	451
Minute Ventilation	451
Vital Capacity	452
Inspiratory Force	452
Diagnostic Assessment of Respiratory Function	452
Pulmonary Function Tests	452
Arterial Blood Gas Studies	452
Radiographic Examination of the Chest	453
Endoscopic Procedures	454
Sputum Studies	456
Thoracentesis	456
Pleural Biopsy	456
Radioisotope Diagnostic Procedures (Lung Scan)	457
Lung Biopsy Procedures	459
Lymph Node Biopsy	459

23 ■ Management of Patients With Conditions of the Upper Respiratory Tract 461

Upper Airway Infections	462
-------------------------	-----