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7th
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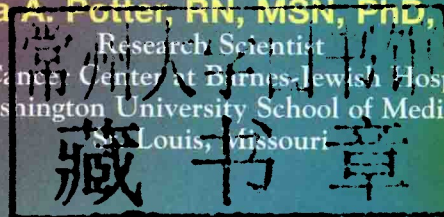
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Edition

Anne Griffin Perry, RN, EdD, FAAN

Associate Dean and Professor
School of Nursing
Southern Illinois University-Edwardsville
Edwardsville, Illinois

Patricia A. Potter, RN, MSN, PhD, FAAN

Research Scientist
Siteman Cancer Center at Barnes-Jewish Hospital and
Washington University School of Medicine
St. Louis, Missouri

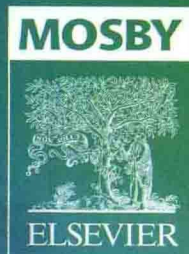


Section Editor

Wendy Ostendorf, RN, MS, EdD

Associate Professor of Nursing
Neumann College
Aston, Pennsylvania

With over 1200 illustrations



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*This book is dedicated to the many professional colleagues
I am proud to be associated with at Barnes-Jewish Hospital.
They practice at a level of excellence few achieve.*

Patricia A. Potter

*As always, this book is dedicated to my children. To be their mother
brings more joy, honor, and sense of pride than I could ever
imagine. They and their loved ones are truly my shining stars. As
they grow, things change, and I now dedicate this book to:*

*My daughter, Rebecca Lacey Perry Bryan, and her husband, Robert
Donald Bryan, and their two daughters Cora Elizabeth Bryan and
Amalie Mary Bryan, and my son: Horace Mitchell "Mitch" Perry.*

Anne G. Perry

Contributors

Jeanette S. Adams, PhD, ACNS-BC, CRNI

Faculty
University of Miami School of Nursing and Health Studies
Coral Gables, Florida

Sylvia K. Baird, BSN, MM

Manager, Nursing Quality
Spectrum Health
Grand Rapids, Michigan

Barbara A. Caton, RN, MSN

Assistant Professor
Missouri State University–West Plains
West Plains, Missouri

Aurelie Chinn, BN, MSN

Academic Nursing Skills and Simulation Specialist/Instructor
Cabrillo College
Monterey, California

Janice C. Colwell, RN, MS, CWOCN, FAAN

Clinical Nursing Specialist
University of Chicago Medical Center
Chicago, Illinois

Kelly Jo Cone, RN, BSN, MS, PhD, CNE

Associate Professor–Graduate Program
Saint Francis College of Nursing
Peoria, Illinois

Ruth Curchoe, RN, MSN, CIC

Director, Infection Prevention and Control
Unity Health Systems
Rochester, New York

Wanda Cleveland Dubuisson, PhD, RN

Associate Professor and Director MSN Program
Joseph and Nancy Fail School of Nursing
William Carey University
Hattiesburg, Mississippi

Jane Fellows, RN, MSN, CWOCN

Ostomy Clinical Nurse Specialist
Duke University Health System
Durham, North Carolina

Susan Jane Fetzer, RN, BA, BSN, MSN, MBA, PhD

Associate Professor
College of Health and Human Services
University of New Hampshire
Durham, New Hampshire

Cathy Flasar, MSN, APRN, BC, FNP

Assistant Professor of Nursing
Barnes-Jewish College
St. Louis, Missouri

Amy Hall, RN, BSN, MS, PhD

Chair, Department of Nursing and Health Sciences
University of Evansville
Evansville, Indiana

Lori Klingman, MSN, RN

Advisor and Faculty
Ohio Valley School of Nursing
McKees Rocks, Pennsylvania

Nancy Laplante, PhD, RN

Assistant Professor
Neumann College
Aston, Pennsylvania

Nelda K. Martin, RN, ANP-BC, CCNS

Critical Care Clinical Nurse Specialist/Adult Nurse Practitioner
Barnes-Jewish Hospital Heart Services
St. Louis, Missouri

Lynne M. Murphy, RN, MSN

Nutrition Support Clinical Specialist
Private Practice/Consultant
Annandale, Virginia

Elaine K. Neel, RN, MSN

Nursing Instructor
Graham Hospital School of Nursing
Canton, Illinois

Mary Jane Ruhland, MSN, RN, BC

Performance Improvement Engineer
Progress West HealthCare Center
O'Fallon, Missouri

Jackie Raybuck Saleeby, PhD, RN, MSN

Associate Professor
Maryville University
Town and Country, Missouri

Julie S. Snyder, MSN, RN-BC

Adjunct Faculty
Old Dominion University, School of Nursing
Norfolk, Virginia

Kelly Schwartz, BSN, RN

Practice Consultant
Center for Practice Excellence
Barnes-Jewish Hospital
St. Louis, Missouri

Patricia A. Stockert, RN, BSN, MS, PhD

Associate Dean Undergraduate Program
Saint Francis Medical Center College of Nursing
Peoria, Illinois

Lynne Tier, RN, MSN, LNC

Associate Professor of Nursing
Learning Center Coordinator
Florida Hospital College of Health Science
Orlando, Florida

Nancy Tomaselli, RN, MSN, CS, CRPM, CWOCN

President and CEO
Premier Health Solutions, LLC
Cherry Hills, New York

Terry L Wood, PhD, RN

Lecturer
Southern Illinois University–Edwardsville
Edwardsville, Illinois

Rita Wunderlich, MSN, PhD

Director Baccalaureate Nursing Program
Assistant Professor
Saint Louis University School of Nursing
St. Louis, Missouri

Rhonda Yancey, BSN, RN

Practice Consultant
Center for Practice Excellence
Barnes-Jewish Hospital
St. Louis, Missouri

Valerie Yancey, PhD, RN, HNC, CHPN

Associate Professor
School of Nursing
Southern Illinois University–Edwardsville
Edwardsville, Illinois

Reviewers

Janet T. Adams, MSN, RT, RN

Nursing Instructor
Southeast Missouri State University
Cape Girardeau, Missouri

Joni Adams, RN, BSN, MSN

Assistant Professor
Ivy Tech Community College of Indiana
Evansville, Indiana

Colleen Andreoni, MSN, APRN, BC-NP

Instructor
Niehoff School of Nursing
Loyola University–Chicago
Chicago, Illinois

Ronda Bales, MN, RN

Adjunct Assistant Professor
Montana State University–Bozeman College of Nursing
Billings, Montana

Martha Baker, PhD, RN, APRN-BC

Director BSN Program
Professor of Nursing
St. John's College of Nursing–Southwest Baptist College
Springfield, Missouri

Doris Bartlett, BSN, MSN

Assistant Professor
Bethel College
Mishawaka, Indiana

Jennifer Beck, MSN, RN

Associate Professor; Chair, Undergraduate Studies
Our Lady of the Lake College
Baton Rouge, Louisiana

Brenda Becker, BSN, MA, RN

Nursing Faculty
North Hennepin Community College
Brooklyn Park, Minnesota

Karen Benjamin, RN, MSN

Assistant Professor
University of Wyoming
Fay W. Whitney School of Nursing
Laramie, Wyoming

Janet E. Bitzan, RN, PhD

Clinical Associate Professor
University of Wisconsin–Milwaukee
Milwaukee, Wisconsin

Phyllis Bonham, PhD, RN, MSN, CWOCN

Associate Professor, Director of Wound Care Education Program
College of Nursing, Medical University of South Carolina
Charleston, South Carolina

Patricia Buchsel, RN, MSN, FAAN

Clinical Instructor
Seattle University College of Nursing
Seattle, Washington

Barbara Caton, MSN, BSN

Assistant Professor of Nursing
Southwest Missouri State University–West Plains
West Plains, Missouri

Aurelie Chinn, RN, MSN

Academic Nursing Skills and Simulation Specialist/Instructor
Cabrillo College
Monterey, California

Lissa Clark, MSN, RN, CNE

Instructor
Adult Health and Illness Department
College of Nursing
University of Nebraska Medical Center
Omaha, Nebraska

Kim Clevenger, MSN, RN, BC

Assistant Professor of Nursing
Morehead State University
Morehead, Kentucky

Patricia Conley, RN, BSN, MSN

Staff Nurse
Research Medical Center of Kansas City
Progressive Cardio-Pulmonary Care Unit
Kansas City, Missouri

Suzanne Costello, RN, MSN

Professional Nurse Educator
Jameson Hospital School of Nursing
New Castle, Pennsylvania

Neva Crogan, PhD, APRN, BC, GNP, FNGNA

Associate Professor
The University of Arizona College of Nursing
Tucson, Arizona

Barbara Derwinski-Robinson, MSN, RNC

Associate Professor
Montana State University–Billings Campus
Billings, Montana

Julie Potter-Dunlop, MN, RN

Assistant Professor
University of Hawaii–Maui
Kahului, Maui, Hawaii

Patricia Duckworth, MSN, APRN

Assistant Professor
University of Hawaii–Maui Community College
Kahului, Hawaii

Kathleen Ellstrom, RN, PhD, APRN, BC

Pulmonary Clinical Nurse Specialist
VA Loma Linda Healthcare System
Loma Linda, California

Susan Erue, RN, BSN, MS, PhD

Professor and Chair, Division of Nursing
Iowa Wesleyan College
Mount Pleasant, Iowa

Debbie Fischer, RN, MSN, CCRN

Adjunct Clinical Professor
University of Delaware School of Nursing
Newark, Delaware

Linda Kay Fluharty, RNC, MSN

Associate Professor
Ivy Tech Community College of Indiana
Indianapolis, Indiana

Cira Fraser, PhD, APRN, BC, MSCN

Associate Professor and Graduate Faculty
Marjorie K. Unterberg School of Nursing and Health Studies
Monmouth University
West Long Branch, New Jersey

Carole Gabriele, RN, BSN, MA, CNOR

Director
Bridgeport Hospital School of Nursing
Bridgeport, Connecticut

Teresa J. Getha-Eby, MSN, RN, C

Instructor
Education and Research Facilitator at Deaconess Hospital
Good Samaritan College of Nursing and Health Science
Cincinnati, Ohio

Margaret Gigstad, MS, RN, CSN

Clinical Assistant Professor
University of Arizona–College of Nursing
Tucson, Arizona

Margaret Gingrich, RN, MSN

Professor of Nursing
Harrisburg Area Community College
Harrisburg, Pennsylvania

Laurie Glover, MN, APRN, FNP, BC

Adjunct Assistant Professor
College of Nursing
Montana State University
Great Falls, Montana

Kathy Ham, RN, EdD

Assistant Professor
Southeast Missouri State University
Cape Girardeau, Missouri

John Harper, MSN, RN-BC

QM&I Reviewer; Clinical Educator
Taylor Hospital
Ridley Park, Pennsylvania

Melissa Henry, BSN, FNP, PhD

Assistant Professor
University of Northern Colorado
Greeley, Colorado

Janice Hoffman, RN, PhD

Instructor
Johns Hopkins School of Nursing
Clinical Nurse
Neurosciences Critical Care Unit
Johns Hopkins Hospital
Baltimore, Maryland

Patricia Hutchison, MSN, RN, CDE

Education Coordinator
Grove City Medical Center
Grove City, Pennsylvania

Helena Jermalovic, MSN, RN

Assistant Professor
University of Alaska–Anchorage
Anchorage, Alaska

Karen Johnson, RN, MSN, FNP-C

Nursing Instructor
Pittsburg State University
Pittsburg, Kansas

Stephanie Johnson, MSN, RN, BC, CNE

Assistant Professor of Nursing
Morehead State University
Morehead, Kentucky

Susan Kamath, MN, RN

Hospital Laboratory Coordinator/Professor of Nursing
Colin Count Community College
McKinney, Texas

Fran Kamp, RN, MSN

Nursing Faculty
Georgia Baptist College of Nursing of Mercer University
Atlanta, Georgia

Susan Porterfield, PhD, ARNP-C, MSN, BSN, MSHRMD, BA

Assistant Professor
Florida State University
Tallahassee, Florida

Theresa Schwindenhammer, RN, MSN

Assistant Professor of Nursing
Methodist College of Nursing
Peoria, Illinois

Corinne Settecase-Wu, MA, RN

Director of Experimental Learning
New York University—College of Nursing
New York, New York

Janet Somlyay, MSN, CNS, CPNP-AC/PC, CNE

Assistant Lecturer
Fay W. Whitney School of Nursing
University of Wyoming
Laramie, Wyoming

Marsha Ray, MSN, RN

Assistant Professor
Weber State University
Logan, Utah

Cherie R. Rebar, MSN, MBA, RN, FNP

Chair, Associate Degree Nursing Program
Assistant Professor
Kettering College of Medical Arts
Kettering, Ohio

Anita Reed, MSN, RN

Clinical Nursing Instructor/Faculty
Saint Joseph's College
Rensselaer, Indiana

Jill Reed, APRN, MSN

Instructor
University of Nebraska Medical Center College of Nursing—
Kearney Division
Kearney, Nebraska

Doreen Rogers, MSN, RN, CCRN

Instructor
St. Elizabeth College of Nursing
Utica, New York

Julie Ryhal, MEd, BSN, LCCE

Education Coordinator
Grove City Medical Center
Grove City, Pennsylvania

Maura Schlairet, RN, MSN, EdD

Assistant Professor
Valdosta State University College of Nursing
Valdosta, Georgia

Angela Stone Schmidt, MSNc, RNP, RN

Assistant Professor of Nursing
College of Nursing and Health Professions
Arkansas State University
Jonesboro, Arkansas

Debra L. Servello, RNP, MSN

Assistant Professor of Nursing
Rhode Island College
Providence, Rhode Island

Gale Sewell, RN, MSN, CNE

Assistant Professor of Nursing
Indiana Wesleyan University
Marion, Indiana

Ann Sprengel, EdD, RN

Professor
Department of Nursing
Southeast Missouri State University
Cape Girardeau, Missouri

Scott C. Thigpen RN, MSN, CCRN, CEN

Assistant Professor of Nursing
South Georgia College
Douglas, Georgia

Donna Thompson, MSN, CRNP, CCCN

Assistant Professor
Neumann College
Aston, Pennsylvania

Della F. Wagner, RN, MSN

Clinical Instructor
University of Texas Health Science Center—San Antonio
San Antonio, Texas

Michelle Lynne Williams, MSN, RN

Assistant Professor
Coordinator of Adult Health I
Austin Peay State University School of Nursing
Clarksville, Tennessee

Kathleen Williamson, BSN, MSN, PhD, RN

Assistant Professor of Nursing
Florida State University
Tallahassee, Florida

Janet Willis, MS, BSN

Senior Professor
Harrisburg Area Community College
Harrisburg, Pennsylvania

Paige Wimberley, RN, APN, CNE

Assistant Professor of Nursing
Arkansas State University
Jonesboro, Arkansas

Toni Wortham, RN, BSN, MSN

Professor of Nursing
Madisonville Community College
Madisonville, Kentucky

Laura Kelly, PhD, APRN, BC

Assistant Professor
Marjorie K. Unterberg School of Nursing and Health Studies
Monmouth University
West Long Branch, New Jersey

Penny Killian, MSN, RN, APN

Assistant Professor
College of Nursing and Health Professions
Drexel University
Philadelphia, Pennsylvania

Pamela Korte, RN, MS

Associate Professor
Monroe Community College
Rochester, New York

Cheryl Lacasse, PhDc, RN, OCN

Clinical Associate Professor
University of Arizona College of Nursing
Tucson, Arizona

Virginia Lester, RN, BSN, MSN

Assistant Professor of Nursing
Angelo State University
San Angelo, Texas

Jennifer Limongiello, MSN, ARNP

Associate Professor of Nursing
New Hampshire Technical Institute
Concord, New Hampshire

Laura Logan, MSN, RN

Clinical Instructor
Stephen F. Austin State University
Nacogdoches, Texas

Cathy A. Loiselle, MS, RN, LRC

Clinical Faculty
Rivier College
Nashua, New Hampshire

Lenora Lorenzo, MDN, APRN-RX, BC FNP/GNP, CDE

Advanced Practice Registered Nurse Practitioner
Faculty University of Hawaii
Honolulu, Hawaii

Bret Lyman, MS, RN

Lecturer of Nursing
University of Northern Colorado School of Nursing
Greeley, Colorado

Diana Mager, CRN, MSN

Director
Fairfield University School of Nursing
Robin Kanarek Learning Resource Center
Fairfield, Connecticut

Kathleen Maher, RN, MSN, CPHQ

Assistant Professor
Monmouth University
Marjorie K. Unterberg School of Nursing and Health Sciences
West Long Branch, New Jersey
Adjunct Clinical Instructor
Brookdale Community College
Lincroft, New Jersey

Gail Marshall, RN, MSN, MeD

Associate Professor
Luzerne Community College
Nanticoke, Pennsylvania

Sheila Matye, MSN, RNC

Adjunct Assistant Professor
Montana State University
Great Falls, Montana

Barbara Maxwell, RN, BSN, MS, MSN, CNS

Associate Professor of Nursing
The State University New York–Ulster Department of Nursing
Stone Ridge, New York

Margaret Anne McNulty, BSN, MSN, PhD

Assistant Professor
School of Nursing
University of Hawaii–Manoa
Manoa, Hawaii

Doreen Mingo, MSN, RN

Assistant Professor of Nursing
Allen College
Waterloo, Iowa

Cindy Mulder, RNC, MS, MSN, CNP

Associate Professor
University of South Dakota
Sioux Falls, South Dakota

Maureen O'Malley, RN, PhD

Assistant Professor
University of Alaska Anchorage School of Nursing
Anchorage, Alaska

Linda Otero, BSN, RN, C

Assistant Professor
Vermont Technical College
Bennington, Vermont

Rebecca Otten, RN, EdD

Assistant Professor
California State University Fullerton
Fullerton, California

Marilyn Parras, RN, DrPH, CNS

Lecturer
California State University Fullerton
Fullerton, California

Jean Yockey, MSN, FNP, CNE

Assistant Professor
University of South Dakota
Vermillion, South Dakota

Clinical Reviewers**Liz Allibonne, PGCTLP, BSc, RGN**

Nurse Teacher
Royal Brompton and Harefield NHS Trust
London, United Kingdom

Pam Bellefeuille, MN, APRN, BC, CNS, CEN

Associate Clinical Professor
University of California–San Francisco
San Francisco, California

Laura M. Criddle, MS, RN, CEN, CCNS

Clinical Nursing Specialist
Premier Jets/Lifeguard Air Ambulance

Ruth M. Curchoe, RN, MSN, CIC

Director, Infection Prevention and Control
Unity Health System
Rochester, New York

Lynn M. Czaplewski, MS, RN, CRNI, OCN

Clinical Assistant Professor
Columbia College of Nursing
Milwaukee, Wisconsin

Stephanie Gilbertson-White

Clinical Nurse Specialist for Pain Management
University of California San Francisco Medical Center
San Francisco, California

Elisabeth Harvey, RN, MSN, CWOCN

Memorial Medical Center
Modesto, California

Gina L. Heard, BSN

Nurse Coordinator for Nutrition Support
Barnes-Jewish Hospital
St. Louis, Missouri

Judith A. Jennrich, RN, PhD

Associate Professor of Nursing
Niehoff School of Nursing, Loyola University
Chicago, Illinois

Elizabeth Lemiska, BSN, RN, CWOCN

Wound, Ostomy, Continence Nurse Specialist
Middlesex Hospital
Middletown, Connecticut

Kathleen Murphy-Ende, RN, PhD, AOCNP

Nurse Practitioner
University of Wisconsin Hospitals and Clinics
Madison, Wisconsin

Kathleen A. Stevens, PhD, RN, CRRN

Quality Improvement Manager, Nursing and Allied Health
Rehabilitation Institute of Chicago
Chicago, Illinois

Marion F. Winkler, MS, RD, LDN, CNSD

Senior Clinical Teaching Associate of Surgery and Surgical
Nutrition Specialist
Brown University Medical School and Rhode Island Hospital
Providence, Rhode Island

Cynthia Ann Worley, BSN, RN, CWOCN

Wound, Ostomy, Continence Nurse
The University of Texas M.D. Anderson Cancer Center
Houston, Texas

Contributors to Previous Editions

We would like to acknowledge the following people who contributed to previous editions of *Clinical Nursing Skills & Techniques*.

Jeannette Adams, PhD, MSN, APRN, CRNI
Nursing Consultant
Coconut Grove, Florida

Della Aridge, RN, MSN
Clinical Nurse Specialist
Abdominal Organ Transplant Service
Saint Louis University Health Sciences Center
St. Louis, Missouri

Elizabeth A. Ayello, PhD, MS, BSN, RN, CS, CWOCN
Clinical Assistant Professor
New York University, Division of Nursing
New York, New York

Margaret Benz, RN, MSN, CSANP
Adjunct Assistant Professor
Saint Louis University
St. Louis, Missouri

Barbara J. Berger, MSN, RN
Clinical Nurse Specialist for Nursing Practice and Nursing
Informatics
Southwest General Health Center Partnering With University
Hospitals Health Systems
Middleburg Heights, Ohio

Lyndal Guenther Brand, RN, BSN, MSN
Instructor, Missouri Baptist Medical Center
School of Nursing
St. Louis, Missouri

Peggy Breckinridge, RN, BSN, MSN, FNP
Associate Professor of Nursing
College of Health Sciences
Roanoke, Virginia

Victoria M. Brown, RN, BSN, MSN, PhD
Associate Professor, School of Nursing
Georgia College and State University
Milledgeville, Georgia

Gina Bufe, RN, BSN, MSN(R), PhD, CS
Psychiatric Clinical Nurse Specialist
Private Practice
Hyannis, Massachusetts

Gale Carli, MSN, MHed, BSN, RN
Assistant Professor
Ohlone College
Fremont, California

Ellen Carson, PhD
Associate Professor
Pittsburg State University
Pittsburg, Kansas

Maureen Carty, MSN, OCN
Oncology Clinical Nurse Specialist
Genesis Medical Center
Davenport, Iowa

Mary F. Clarke, MA, RN
Informatics Nurse Specialist
Genesis Medical Center
Davenport, Iowa

Janice C. Colwell, RN, MS, CWOCN
Clinical Nurse Specialist
University of Chicago Hospitals
Chicago, Illinois

Dorothy McDonnell Cooke, RN, PhD
Associate Professor of Nursing
Saint Louis University Health Sciences Center
St. Louis, Missouri

Eileen Costantinou, RN, BSN, MSN
Professional Practice Consultant
Barnes-Jewish Hospital
St. Louis, Missouri

Sheila A. Cunningham, RN, BSN, MSN
Assistant Professor of Nursing
Neumann College
Aston, Pennsylvania

Rick Daniels, RN, BSN, MSN, PhD
Associate Professor of Nursing
Oregon Health Sciences University at Southern
Ashland, Oregon

Carolyn Ruppel d'Avis, RN, BSN, MSN
Director, Baccalaureate Program/Adjunct Assistant Professor
The Catholic University of America
Washington, DC

Mardell Davis, RN, MSN, CETN
School of Nursing
University of Alabama
Birmingham, Alabama

Patricia A. Dettenmeier, RN, BSN, MSN(R), CCRN
Assistant Clinical Professor, School of Nursing
Instructor in Medicine, School of Medicine
Saint Louis University
St. Louis, Missouri

Wanda Cleveland Dubuisson, BSN, MN
Assistant Professor
University of Southern Mississippi, College of Nursing
Hattiesburg, Mississippi

Sharon J. Edwards, RN, MSN, PhD

Assistant Professor
College of Nursing
University of South Florida
Tampa, Florida

Martha E. Elkin, RN, MSN

Lactation Counselor
Stephens Memorial Hospital
Norway, Maine

Deborah Oldenburg Erickson, RN, BSN, MSN

Instructor, School of Nursing
Methodist Medical Center of Illinois
Peoria, Illinois

Debra Farrell, BSN, CNOR

Operating Room Staff Nurse
Saint Anthony's Medical Center
St. Louis, Missouri

Linda Fasciani, RN, BSN, MSN

Assistant Professor of Nursing
County College of Morris
Randolph, New Jersey

Susan Jane Fetzer, RN, BA, BSN, MSN, MBA, PhD

Associate Professor
University of New Hampshire
Durham, New Hampshire

Marlene S. Foreman, BSN, MN, RNCS

Associate Professor of Nursing
Louisiana State University at Eunice
Eunice, Louisiana

Carol P. Fray, RN, MA

Associate Professor, Adult Health Nursing
College of Nursing
University of North Carolina at Charlotte
Charlotte, North Carolina

Leah W. Frederick, RN, MS, CIC

Consultant
Infection Control Consultants
Scottsdale, Arizona

Paula Goldberg, RN, MS, MSN

Oncology Clinical Coordinator
Barnes Hospital
St. Louis, Missouri

Thelma Halberstadt, EdD, MS, BS, RN

Professor
Northern Essex Community College
Lawrence, Massachusetts

Amy Hall, PhD, MS, BSN, RN

Assistant Professor
Saint Francis Medical Center, College of Nursing
Peoria, Illinois

Linda C. Haynes, PhD, RN

Associate Professor
University of Northern Colorado
Greeley, Colorado

Diane Hildwein, RN, BC, MA

Director of Nursing Clinical Education
St. Luke's Hospital
Chesterfield, Missouri

Maureen B. Huhmann, MS, RD

Clinical Instructor and Clinical Dietician
University of Medicine and Dentistry of New Jersey
Newark, New Jersey

Nancy C. Jackson, RN, BSN, MSN, CCRN

Pulmonary Clinical Nurse Specialist
St. Mary's Health Center
St. Louis, Missouri

Ruth L. Jilka, RD, CDE

Diabetes Educator
Barnes Hospital
St. Louis, Missouri

Teresa M. Johnson, RN, MSN, CCRN

Clinical Nurse Specialist
The Medical Center of Central Georgia
Macon, Georgia

Judith Ann Kilpatrick, RN, DNSC

Assistant Professor
Widener University School of Nursing
Chester, Pennsylvania

Carl Kirton, RN, BSN, MA, CCRN, ACRN, ANP

Clinical Assistant, Professor of Nursing
New York University
New York, New York

Marilee Kuhrik, RN, MSN, PhD

Associate Professor
Colorado Mountain College
Glenwood Springs, Colorado

Nancy S. Kuhrik, RN, MSN, PhD

Associate Professor
Colorado Mountain College
Glenwood Springs, Colorado

Diane M. Kyle, RN, BSN, MS

Doctoral Candidate
Supervisor of Clinical Services/Clinical Nurse Specialist
East Hartford Visiting Nurse Association, Inc.
East Hartford, Connecticut

Louise K. Leitao, RN(c), BSN, MA

Director of Clinical Services
East Hartford Visiting Nurses Association, Inc.
East Hartford, Connecticut

Gail B. Lewis, RN, MSN

Associate Professor
Barnes College
St. Louis, Missouri

Ruth Ludwick, PhD, MSN, BSN, RNC, CNS

Associate Professor
Kent State University
Kent, Ohio

Mary Kay Macheca, MSN(R), RN, CS, ANP, CDE

Certified Adult Nurse Practitioner and Certified Diabetes Educator
The Bortz Diabetes Control Center
Richmond Heights, Missouri

Jill Feldman Malen, RN, MS, NS, ANP

Clinical Nurse Specialist
Barnes-Jewish Hospital at Washington University Medical Center
St. Louis, Missouri

Sharon Souter, MSN, BSN

Director of Nursing Program
New Mexico State University at Carlsbad
Carlsbad, New Mexico

Martha A. Spies, RN, MSN

Assistant Professor
Deaconess College of Nursing
St. Louis, Missouri

Patricia A. Stockert, RN, BSN, MS, PhD

Associate Dean of Undergraduate Program
Saint Francis Medical Center College of Nursing
Peoria, Illinois

Sandra Ann Szekely, RN, BSN

Director, Clinical and Infusion Services
Comfort Care of Michigan
Troy, Michigan

Nancy Tomaselli, RN, MSN, CS, CRNP, CWOCN, CLNC

President and CEO
Premier Health Solutions, LLC
Cherry Hills, New York

Riva Touger-Decker, PhD, RD, FADA

Associate Professor and Program Director
Graduate Programs in Clinical Nutrition,
Department of Primary Care, SHRP
Division of Nutrition, Department of Diagnostic Sciences
New Jersey Dental School
Newark, New Jersey

Joan Domigan Wentz, MSN, RN

Assistant Professor
Barnes-Jewish College of Nursing and Allied Health
St. Louis, Missouri

Terry L. Wood, PhD, RN

Assistant Professor
Barnes-Jewish College of Nursing and Allied Health
St. Louis, Missouri

Anne Falsone Vaughan, MSN, BSN, CCRN

Clinical Instructor
Bellarmine College, Lansing School of Nursing
Louisville, Kentucky

Cynthia Vishy, RN, BSN

Manager, Clinical Education
St. Louis Children's Hospital
St. Louis, Missouri

Pamela Becker Weilitz, MSN(R), RN, CS, ANP

Adult Nurse Practitioner
South City Health, LLC
St. Louis, Missouri

Laurel Wiersema, RN, MSN

Surgical Clinical Nurse Specialist
Barnes Hospital
St. Louis, Missouri

Rita Wunderlich, PhD(C), MSN(R), CCRN

Doctoral Candidate, Saint Louis University
Instructor
Clinical Nurse
Saint Louis University Hospital
St. Louis, Missouri

Rhonda Yancey, BSN, RN

Consultant, Professional Practice
Barnes-Jewish Hospital
St. Louis, Missouri

Mary K. Mantese, RN, MSN

Director of Patient Care Services/Chief Nurse Executive
Barnes-Jewish West County Hospital
St. Louis, Missouri

Elizabeth Mantych, RN, MSN

Faculty
University of Missouri at St. Louis School of Nursing
St. Louis, Missouri

Tina Marrelli, MSN, MA, RN

Professor and Director
Transcultural Nursing Institute and MSN Program
Kean University
Union, New Jersey

Nelda K. Martin, APRN, BC, CCNS, ANP

Critical Care Clinical Nurse Specialist and Adult Nurse Practitioner
Barnes-Jewish Hospital at Washington University Medical Center
St. Louis, Missouri

Mary Mercer, RN, MSN

Coordinator, Cardiac Rehabilitation
St. John's Mercy Medical Center
Creve Coeur, Missouri

Rita Mertig, MS, BSN, RNC, CNS

Professor
John Tyler Community College
Richmond, Virginia

Norma Metheny, PhD, MSN, BSN, FAAN

Professor and Dorothy A. Votsmier Chair in Nursing
Saint Louis University School of Nursing
St. Louis, Missouri

Mary Dee Miller, RN, BSN, MS, CIC

Nurse Epidemiologist
Mercy Hamilton/Fairfield Hospitals
Hamilton, Ohio

Sharon M. J. Muhs, MSN, RN

Registered Nurse
Saint Luke's Hospital
Chesterfield, Missouri

Kathleen Mulryan, RN, BSN, MSN

Professor of Nursing
LaGuardia Community College
Long Island City, New York

Elaine K. Neel, RN, BSN, MSN

Nursing Instructor
Graham Hospital School of Nursing
Canton, Illinois

Meghan G. Noble, PhD, RN

Staff Nurse
MICU, Strong Memorial Hospital
University of Rochester Medical Center
Rochester, New York

Marsha Evans Orr, RN, BS, MS, CS

Zone Clinical Manager
Apria Healthcare
Phoenix, Arizona

Dula F. Pacquiao, EdD, RN, CTN

Professor and Director
Transcultural Nursing Institute and MSN Program
Kean University
Union, New Jersey

Sharon Phelps, RN, BSN, MS

Nursing Practice Consultant
Barnes-Jewish Hospital
St. Louis, Missouri

Catherine A. Robinson, BA, RN

Clinical Nurse Manager
Barnes-Jewish Hospital

Judith Roos, RN, MSN

Associate Professor
Jewish Hospital College of Nursing and Allied Health
St. Louis, Missouri

Jane Ruhland, RN, MSN, BSN

Education Coordinator
Barnes-Jewish St. Peters Hospital
St. Peters, Missouri

Jan Rumfelt, RNC, MSN, EdD

Associate Professor, School of Nursing
Southern Illinois University-Edwardsville
Edwardsville, Illinois

Jacqueline Raybuck Saleeby, PhD, RN, CS

Associate Professor
Jewish Hospital College of Nursing and Allied Health
St. Louis, Missouri

Linette M. Sarti, RN, BSN, CNOR

Operating Room Charge Nurse
Bayfront Medical Center
St. Petersburg, Florida

Kelly M. Schwartz, RN, BSN

Professional Practice Consultant
Barnes-Jewish Hospital
St. Louis, Missouri

April Sieh, RN, BSN, MSN

Assistant Professor
Delta College
University Center, Michigan

Marlene Smith, RN, BSN, MEd

Staff Development Specialist
St. Louis Regional Medical Center
St. Louis, Missouri

Julie Snyder, MSN, RNC

Faculty
Louise Obici School of Nursing
Suffolk, Virginia

Laura Sofield, MSN, APRN, BC

Director of Clinical Practice
Meridian Institute for Aging, Senior Health Center
Manchester, New Jersey

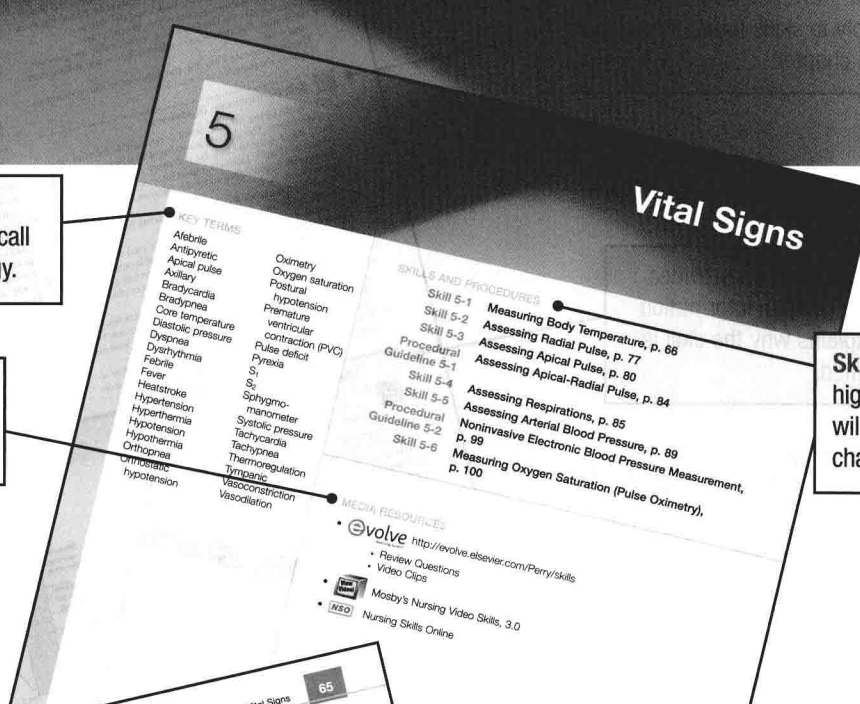
Preface to the Student

Key Terms are listed at the beginning of each chapter to call attention to critical terminology.

Media Resources detail the electronic resources available for each chapter.

Objectives highlight key information to follow.

Skills and Procedures highlight the skills you will focus on in each chapter.



OBJECTIVES

Mastery of content in this chapter will enable the nurse to:

- Identify when it is appropriate to assess each vital sign.
- Accurately assess a patient's oral, rectal, axillary, tympanic, membrane, and temporal artery temperatures.
- Correctly record vital signs.
- Describe factors that cause variations in body temperature, pulse, blood pressure, oxygen saturation, and respirations.
- Discuss factors in selecting temperature measurement sites.
- Accurately assess a patient's respirations.
- Explain implications of a pulse deficit.
- Explain implications of a patient's respirations.

- Accurately measure a patient's blood pressure using techniques of auscultation and palpation.
- Discuss benefits and disadvantages of using an automatic blood pressure machine.
- Describe factors in selecting an extremity to measure blood pressure.
- Accurately assess a patient's oxygenation status using pulse oximetry.
- Identify ranges of acceptable vital sign values for infant, child, and adult.
- Appropriately delegate vital sign measurements to assistive personnel.

Temperature, pulse, blood pressure (BP), oxygen saturation, and respirations are the most frequent measurements obtained by health care practitioners. These measurements indicate if the circulatory, pulmonary, neurological, and endocrine body systems are functioning normally. Because of their importance as indicators of the body's physiological status and response to physical, environmental, and psychological stressors, they are referred to as vital signs. Vital signs reveal sudden changes in a patient's condition, as well as changes that occur progressively over time. Any difference between a patient's normal baseline measurement and present vital signs may indicate the need for nursing therapies and present vital medical interventions.

thermometer are needed to confirm temperature measurements made with a tympanic membrane thermometer. Pulse oximetry measurements change patient care and outcomes (Lockwood and others, 2004). Many factors influence reading as measured by pulse oximetry (SpO₂). The influence of nail polish is controversial. A recent study tested 10 nail polish colors on healthy volunteers and found no clinically significant difference in oxygen saturation measurement. A new oximeter sensor, attached to the forehead, eliminates the need for nail polish removal. You can use the forehead sensor in patients who have poor peripheral perfusion. When compared to the gold standard of the arterial blood gas level, the forehead sensor was more accurate than the finger probe (Schallom and others, 2007).

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Pain, a subjective symptom, is often referred to as a vital sign along with the physiological signs. Very few patients do not experience some level of discomfort or pain. For this reason, assessment of a patient's pain status is critical to understanding a patient's clinical status and progress. You will frequently perform measurement of a patient's level of comfort and pain with vital sign measurements. Chapter 15 summarizes pain assessment (see Chapter 6). The nurse's findings aid in determining whether it is necessary to assess specific vital signs more thoroughly. For example, during a routine vital sign assessment, the nurse notes an abnormal respiratory rate; the nurse then auscultates lung sounds to evaluate the drug's effects. Part of the nurse's clinical judgment involves deciding which vital sign to measure, when to obtain measurements, and the frequency of assessment (Box 5-1). Always obtain a baseline measurement of vital signs upon first contact with a patient to provide a means for comparison with later vital sign measurements.

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EVIDENCE-BASED PRACTICE TRENDS

Numerous devices are available to measure temperature, although the most accurate and easiest devices to use are not always the most commonly used thermometers. A recent study compared these common devices against the pulmonary artery thermometer, the gold standard of core temperature (Lawson and others, 2007). Findings indicated that both the oral and temporal artery temperatures were similar to the core pulmonary artery. The membrane temperature was less accurate. A similar study by Fennell and others (2005) found that the tympanic thermometer was a highly variable, as much as 1° C. When treatment decisions are involved, repeat measurements with an oral or temporal artery

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BOX 5-1 When to Take Vital Signs

- 1 On a patient's admission to a hospital or admission to a health care provider
- 2 Before, during, and after a procedure
- 3 Before and after the administration of therapies that alter temperature control (unclothed, before, during, and after blood, urine, and stool; before, during, and after a procedure)
- 4 Before and after the patient reports specific symptoms of physical distress (e.g., feeling "funny" or "different")
- 5 When the patient's general physical condition changes (e.g., loss of consciousness, increased intensity of pain)

Cultural Considerations provide guidance for care of culturally diverse clients.

Skill Performance Guidelines apply to skills found throughout the chapter.

Skill Introduction provides valuable general information and explains why the skill is performed.

Easy-to-follow two-column format includes rationales for each step.

Critical Decision Points to consider when performing skills ensure effective outcomes and promote safety.

66 CHAPTER 8 Vital Signs

- Collectivistic cultures (e.g., Hispanics, Africans, and Asians) demonstrate their caring for ill members by protecting them.
- Document this information in the patient's chart.
- Communicate the family decision to the health care provider.
- Determine that the patient understands how you will measure vital signs.
- Use an interpreter if needed, and demonstrate the procedure to promote the patient's understanding.

Skill Performance Guidelines

- The nurse caring for the patient is responsible for vital signs measurement. The skill of measurement of selected vital signs (i.e., stable patients) can be delegated to nursing assistive personnel (NAP). However, nurses must analyze vital signs to interpret their significance and make decisions about appropriate interventions.
- Equipment must be functional and appropriate for the patient's size, age, condition, and characteristics.
- The nurse knows the patient's usual range of vital signs. A patient's usual values may differ from the acceptable range for that age or physical state. A patient's usual values serve as a baseline for comparison with later findings; thus you detect changes in condition over time.
- The nurse knows the patient's medical history, therapies, and prescribed medications. Some illnesses or treatments cause predictable vital sign changes. Most medications affect at least one of the vital signs.
- The nurse controls or minimizes environmental factors that affect vital signs. For example, assessing the patient's temperature in a warm, humid room may yield a value that is not a true indicator of the patient's condition.

6 An organized, systematic (step-by-step) approach when taking vital signs ensures accuracy of findings.

7 Based on the patient's condition, collaborate with the health care provider to decide the minimum frequency of vital sign assessment. In the hospital, the health care provider will under a minimum frequency of vital sign measurements for each patient. Following surgery or treatment interventions, measure vital signs more frequently to detect complications. In a clinic or outpatient setting, take vital signs before the health care provider examines the patient and after any invasive procedures. monitor the vital signs as often as every 5 to 15 minutes. The nurse is responsible for judging whether more frequent assessments are necessary.

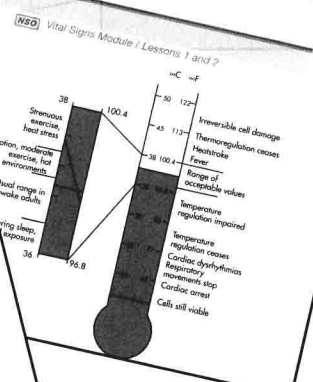
8 Analyze the results of vital sign measurements, and incorporate all the clinical findings about a patient in determining nursing diagnoses. You do not interpret vital signs in isolation. You need to know related physical signs or symptoms and be aware of the patient's ongoing health status.

9 Document vital signs and communicate significant changes in vital signs to the nurse in charge. Baseline measurements allow a nurse to identify changes in vital signs. When vital signs appear abnormal, it helps to have another nurse repeat the measurement. Inform the health care provider when vital signs become abnormal, and report any changes to the nurse in charge.

SKILL 5-1 Measuring Body Temperature

Basic Skills / Vital Signs / Taking a Temperature With an Electronic Thermometer; Taking a Temperature With a Tympanic Thermometer

Body temperature is the difference between the heat produced by body processes and the amount of heat lost to the external environment. The core temperature remains within a narrow range, and the body temperature rises and falls as a result of changes in heat balance.



70 CHAPTER 8 Vital Signs

STEP

- Determine appropriate measurement site and device for patient (see Box 5-3). Use disposable thermometer for patient on isolation precautions.
- Determine previous baseline temperature and measurement site (if available) from patient's record.

NURSING DIAGNOSES

- Hypothermia
- Hypothermia

Individualize related factors based on patient's condition or needs.

PLANNING

- Expected outcomes following completion of procedure:
 - Body temperature is within acceptable range for patient's age-group.
 - Body temperature returns to baseline range following therapy for abnormal temperature.
- Explain to patient the way you will measure temperature and importance of maintaining proper position until reading is complete. Verify that patient has not had anything to eat or drink and not has chewed gum or smoked within the past 15 minutes of having oral temperature measured.

IMPLEMENTATION

- Perform hand hygiene.
- Assist patient to comfortable position that provides easy access to temperature measurement site.
- Obtain temperature measurement with electronic thermometer.
 - Obtain oral temperature measurement with electronic thermometer.
 - Apply clean gloves (optional).
 - Remove thermometer pack from charging unit. Attach oral thermometer probe stem (blue tip) to each oral thermometer unit. Grasp top of the probe stem, being careful not to apply pressure on the ejection button.
 - Slide disposable plastic probe cover over thermometer probe stem until cover locks in place (see illustration).

RATIONALE

Determines if patient's status contraindicates selection of a specific method or site.

Allows nurse to assess for change in condition. Provides comparison with future temperature measurements.

- Ineffective thermoregulation
- Risk for imbalanced body temperature

Thermoregulation is maintained.

Nurse controls for environmental factors that alter temperature.

Promotes patient cooperation and increases compliance. Patients are often curious about their temperatures and should be cautioned against prematurely removing the thermometer to read results. Oral food and fluids, smoking, and gum can alter temperature measurement.

Reduces transmission of microorganisms.

Ensures both patient's comfort and accuracy of temperature reading.

Use of an oral probe cover, which can be removed without physical contact, minimizes need to wear gloves.

Charging provides battery power. Ejection button releases plastic cover from probe stem.

Soft plastic cover will not break in patient's mouth and prevents transmission of microorganisms between patients.

SKILL 5-2 Assessing Radial Pulse

79

RATIONALE

Fingertips are most sensitive parts of hand to palpate arterial pulsation. Nurse's thumb has pulsation that interferes with accuracy of full exposure of artery to palpation.

Pulse assessment is more accurate when using moderate pressure. Strength reflects volume of blood ejected against arterial wall with each heart contraction. Accurate description of arterial wall with proper communication among nurses and other health care providers.

Rate is determined accurately only after pulse has been palpated. Timing begins with zero. Count of one is first beat palpated after timing begins.

A 30-second count is accurate for rapid, slow, or irregular pulse rates.

Inefficient contraction of heart fails to transmit pulse wave, resulting in irregular pulse. Longer time ensures accurate count.

A marked difference between pulses indicates arterial flow is compromised to one extremity and nurse needs to take action.

Promotes comfort and sense of well-being.

Promotes participation in care and understanding of health status.

Reduces transmission of microorganisms.

Used to compare future pulse assessments.

Allows nurse to assess for change in patient's condition and for presence of cardiac alteration.