Fundamentals of Nursing

The Art and Science of Person-Centered Care

Tenth Edition

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We jointly dedicate this special 10th edition written during the COVID-19 pandemic and the 2020–2021 Years of the Nurse and the Midwife, honoring the 200th anniversary of the birth of Florence Nightingale. We dedicate this text to all nurses everywhere who continue to care for society's most vulnerable and to the educators preparing the next generation of nurses to continue this service. May we always earn recognition as the most trusted profession.

—Carol, Pam, and Jennifer

A SPECIAL NOTE FROM THE AUTHOR TEAM

This text and every element in the teaching–learning package have been revised during a time that none of us could have envisioned. We have written and rewritten numerous chapters too often to count as new developments within our global community, country, and profession commanded our attention and begged to be brought to yours! Never have we been prouder to be nurses, and never have the demands on our expertise, energy, commitment, and resilience been greater. We recently read that nurses today need dedication, strength, grit, resilience, innovation, and kindness. We would add love, love for humanity, including love for self. So what are some of these new developments?

- As the American Nurses Association celebrated its 125th anniversary, it released the fourth edition of its *Scope and Standards of Practice* in May 2021. A major revision, this edition includes a new definition of nursing which references the art and science of caring, human functioning, compassionate presence, and recognition of the connection of all humanity.
- Earlier in 2021, the American Association of Colleges of Nursing released the re-envisioned *Essentials* that define competency requirements for baccalaureate and graduate nursing program graduates. These will revolutionize how nurses are prepared for entry-level and advanced roles.
- The National Council of State Boards of Nursing (NCSBN) announced the new Next Generation NCLEX (NGN) promising to incorporate the assessment of clinical judgment utilizing new evaluation model and question design.
- Simultaneously, the National Academies of Sciences, Engineering, and Medicine released *The Future of Nursing 2020–2030: Charting a Path to Achieve Health Equity.* This report outlines and affirms the role nurses can play in creating healthy communities for all. Understanding the dramatic changes the health care industry is undergoing, this report summarizes the challenges health care and the nursing profession are likely to face in the future and discusses steps for overcoming them, including how nurses can:
  - Work over the next decade to reduce health disparities and promote equity
  - Address rising costs through more equitable care delivery
  - Use technology to maximize reaching vulnerable populations
  - Prioritize patient- and family-centered care
- The COVID-19 pandemic continues to stretch every sector of health care, including our nurse leaders and front-line caregivers, to dig deep and give all they have to meet daunting demands for care.
- Disparities in health care, for far too long, have gone unacknowledged. Diversity, inclusion, and equity require active engagement.
- Similarly, climate change is no longer a theory, as massive fires, flooding, drought, and other climate extremes ravage the globe. What every nurse can do to promote environmental health and essential contributions.

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PREFACE

Today's competitive, market-driven health care environment is challenging the very nature of professional nursing practice. *Fundamentals of Nursing: The Art and Science of Person-Centered Care, Tenth Edition*, promotes nursing as an evolving art and science, directed to human health and well-being. It challenges students to cultivate the Quality and Safety Education for Nurses (QSEN) and blended competencies they will need to serve patients and the public well. Our aim is to prepare nurses who combine the highest level of scientific knowledge and technical skill with responsible, caring practice. We want to challenge students to identify and master the cognitive and technical skills required of a nurse. But we also intentionally integrate other core content including interprofessional/intraprofessional/interpersonal communication, ethical comportment, legal regulations and standards, population health principles, and a systems-based perspective to facilitate the development of the student nurse as a member of the profession. We refuse to allow love of humanity, accountability, caring relationships, compassionate presence, and advocacy to become relics of a bygone era.

Those new to nursing can quickly become overwhelmed by the demands placed on the nurse's knowledge, technical competence, interpersonal skills, and commitment. Therefore, much care has gone into the selection of both the content in this edition and the manner of its presentation. We strive to capture the unique essence of both the art and science of nursing, distilling what the person beginning the study and practice of nursing needs to know. We invite students to identify with the profession, to share in its pride, and to respond to today's challenges competently, enthusiastically, and accountably. The Gallop Poll for 2021 noted that nurses earned the most trusted professional distinction for the 20th year. We hope to provide an opportunity for students to appreciate how their individual, unique talents contribute to and strengthen the profession of nursing.

LEARNING EXPERIENCE

This text and the entire Taylor Suite have been created with the student's experience in mind. Care has been taken to appeal to all learning styles. The student-friendly writing style ensures that students will comprehend and retain information. The updated art program and strong features enhance understanding of important concepts. The textbook features, interrelated Fundamentals products, and associated CoursePoint resources have been intentionally developed and integrated to provide a consistent, cohesive learning experience.

ORGANIZATION

Fundamentals of Nursing: The Art and Science of Person-Centered Care, Tenth Edition, is organized into seven units. Ideally, the text is followed sequentially, but every effort has been made to respect the differing needs of diverse curricula and students. Thus, each chapter stands on its own merit and may be read independently of others. Nursing Concepts lists in each chapter opener highlight connections to fundamental nursing concepts and support ease of identification, especially for concept-based nursing programs.

Unit I, Foundations of Thoughtful, Person-Centered Nursing Practice

Unit I opens with a description of contemporary nursing. Successive chapters introduce content foundational to nursing practice: theory, research, and evidence-based practice; health, illness, and disparities; health of the individual, family, community and environment; cultural diversity; values, ethics, and advocacy; legal dimensions of nursing practice; communication; teaching and counseling; and leadership, managing, and delegating.

Unit II, Health Care Delivery

Unit II is completely revised in light of the continuing changes in health care delivery. The new content highlights nurses' expanding roles in care coordination as partnerships are forged with patients, families, local and global communities, and the populations we serve. Chapters address the variety of community-based health care settings; continuity of care as the patient enters a health care facility, is transferred within the facility, and is discharged into another setting within the community; and care provided within the home. This unit highlights ANA's Principles for Health System Transformation, IHI's quadruple aim, new information on Reliability Care Accountability Matrix, and updated health care reform information that emphasizes nurses' contributions.

Unit III, Processes of Thoughtful, Person-Centered Practice

Unit III offers a thoroughly revised and detailed, step-by-step guide to each component of the nursing process with practical guidelines and examples included in each chapter. Each chapter concludes with a section on "Reflective

Practice Leading to Personal Learning" that invites readers to look at their experience with each step of the nursing process, understand it, and learn from it. The goal is always to invite reflection on how we can improve our thoughtful, person-centered practice.

Chapter 13 offers a careful introduction to thoughtful, person-centered practice with expanded content on theories of caring, clinical reasoning, clinical judgment, decision making, and reflective practice. Separate chapters address the nursing process as a whole: Quality and Safety Education for Nurses (QSEN) and blended competencies, clinical reasoning, clinical judgment, assessing, diagnosing/problem identification, outcome identification and planning, implementing, and evaluating. Chapter 14 is a new chapter dedicated exclusively to clinical judgment that describes new features in the text. Chapter 16, previously focused on nursing diagnoses, now has a new focus on analyzing and hypothesizing to identify patient problems and needs. Chapter 20 includes expanded content on privacy guidelines and standards for social media, electronic health records (EHRs), reporting, and conferring. Chapter 21, Informatics and Health Care Technologies is responsive to what today's nurses need to know about how best to use new technologies and information to coordinate care and achieve desired outcomes. There is recognition that more health care facilities and organizations are combining virtual services with in-person care to ease hospital burden and provide better patient experiences and satisfaction. Central to this transition is telehealth, remote monitoring, and mobile care teams.

Unit IV, Developmentally Appropriate Care

Unit IV provides the basis for understanding growth and development across the lifespan and acknowledges nursing's differing requirements arising from the various developmental stages and abilities to meet developmental tasks. This content is framed to recognize the historical context and core tenets of developmental theories, while reinforcing that inclusivity and acceptance without bias are essential to good nursing care.

Unit V, Actions Basic to Nursing Care

Unit V introduces the foundational skills used by nurses: maintaining asepsis, measuring vital signs, assessing health, promoting safety, incorporating complementary and alternative therapies, administering medication, and caring for surgical patients. Chapter 29 was reorganized around the person-centered, systems-based, and population-based aspects of safety and security to intentionally integrate the spheres of practice and highlight three new domains in AACN's *Essentials*: person-centered care (domain 2), systems-based practice (domain 7), and population health (domain 3). Chapter 31 relies on guidance from professional nursing organizations with expertise in perioperative nursing.

Unit VI, Promoting Healthy Physiologic Responses

Unit VI explores the nurse's role in helping patients meet basic physiologic needs: hygiene; skin integrity and wound care; activity; rest and sleep; comfort and pain management; nutrition; urinary elimination; bowel elimination; oxygenation and perfusion; and fluid, electrolyte, and acid–base balance. Chapter 33 contains the latest guidance on pressure injury prevention, staging, and management. Chapter 36 addresses the opioid crisis and challenges students to consider different perspectives regarding legal ramifications and related structural disparities. Chapter 40 includes cardiovascular content as it pertains to its role in oxygenation. In each chapter, guidelines are included for assessing and diagnosing unhealthy responses and for planning, implementing, and evaluating appropriate care strategies.

Unit VII, Promoting Healthy Psychosocial Responses

Unit VII uses the same format as Unit VI to focus on the psychosocial needs of patients: self-concept; stress and adaptation; loss, grief, and dying; sensory functioning; sexuality; and spirituality.

THEMES

The following themes are interwoven throughout the text to provide a broad knowledge base of nursing essentials while emphasizing holistic care.

Thoughtful Person-Centered Care

Our subtitle reflects today's emphasis on person-centered care. Readers will now see an even stronger emphasis on clinical reasoning, clinical judgment, decision making, and reflective practice in every chapter. Central to this model are the nurse's personal attributes, knowledge base, and clinical experience; clinical reasoning, clinical judgment, and decision making; patient-centered nursing process; and reflective practice leading to personal learning.

Nursing as an Art and Science

Nursing as a science is characterized by a growing body of knowledge that links technical and interpersonal interventions to desired patient outcomes; as an art, nursing demands of its practitioners sufficient competency to creatively design individualized strategies to assist patients to reach personal health goals. A unique spirit of caring always must prevail.

Professional Formation of the Nurse

Responding to emphases in the AACN's *Essentials*, this edition weaves content about the professional formation of the nurse into every chapter. The goal is to form students who own the professional identity of the nurse and are intentional about developing the character and values of the nurse as well as the knowledge, skills, and attitudes. Every effort has been made to incorporate content from the ANA *Nursing: Scope and Standards of Practice* (4th ed.), AACN's *Essentials*,

and the National Academy of Sciences, Engineering and Medicine's *The Future of Nursing 2020–2030.*

Integrated Nursing Process

After the nursing process is introduced in Unit III, it provides the organizational framework for successive chapters. The *2021 Nursing Scope and Standards of Practice* highlights the continuing importance of nursing process:

> Regardless of the theoretical knowledge base upon which nursing and its practice are derived, that knowledge fits within the multidimensional nursing process, the analytical, critical-thinking framework guiding professional thinking and activities.

Chapters in Units VI and VII, which deal with physiologic and psychosocial responses, begin with a succinct background discussion of the concept, followed by identification of factors that influence how different individuals respond to these needs. Phases in the nursing process are used to describe related nursing responsibilities. Throughout these chapters, students will find numerous practical examples of how to conduct focused assessments; develop and write problem statements; identify goals and outcomes; and select, implement, and evaluate appropriate nursing interventions. These examples will reinforce the student's mastery of nursing process skills. Some chapters in Units VI and VII conclude with a Nursing Care Plan that illustrates each phase of the nursing process and a sample documentation of nursing assessment or intervention. Others feature Evolving Case Studies based on NCSBN's model of evolving cases with directed questions at each level of the Clinical Judgment Measurement Model. The answers to these cases are included only in the instructor materials to allow nurse educators to use them as desired. In addition, Concept Maps demonstrating the nursing process are included in several chapters. The basic concept map structure for nursing students just starting to consider the nursing process incorporates: (1) beginning pathophysiologic principles, laboratory values, and medications; (2) actual and potential patient problems; and (3) related nursing interventions. Concept mapping provides the learner the opportunity to visually depict and explore connections between disease processes, problems identified by nurses, and individualized nursing interventions. Although concept maps can take many forms, the beginning maps in this text focus on identifying connections using a specific format that provides students a starting point for mapping. The concept map in Chapter 31, Perioperative Nursing, depicts a different structure, designed to show students a way to organize their thoughts as they begin to think like nurses.

Critical Thinking, Clinical Reasoning, and Clinical Judgment

This edition describes carefully curated options that are discussed separately and in tandem to build ways of knowing through the lens of clinical judgment. Clinical judgment is foundational to what we do as nurses. Building a shared understanding of the elements fundamentally shifts the focus of students to the processes they will need to learn and apply. Addressed are:

- Tanner's (2006) Model of Clinical Judgment
- Lasater's (2007) Clinical Judgment Rubric
- Nielson, Stragnell, and Jester (2007) Reflection Tool
- Gibb's Model of Reflection (1988)
- Nursing Process

The 10th edition continues to invite students to reflect on their ability to be the critical difference for recipients of their thoughtful practice. The revised *Self-Reflective Practice* boxes, *Focused Critical Thinking Guides*, and *Developing Clinical Reasoning and Clinical Judgment* material in each chapter challenge students to use new knowledge and experience to "think through" learning exercises designed to demonstrate how careful thinking can change outcomes. The ninth edition added Reflective Practice Leading to Personal Learning content to Chapters 8 and 9 in Unit I and each of the chapters in Units III, VI, and VII. In addition to a brand-new chapter on Clinical Judgment, the 10th edition added a new feature, Thoughtful Person-Centered Practice: Challenging Topics, which offers evolving scenarios of challenging and relevant issues based on Tanner's Clinical Judgment Model (2006) and the reflection tool developed by Nielson, Stragnell, and Jester (2007). These exercises challenge students to reflect upon and critique how they would respond to real practice situations—each designed to promote their professional formation and ability to think, value, and practice like a nurse.

Competency Models

Competency models outline very specific tasks or goals and are directly related to the measurement of nursing clinical judgment. These competency models are used in the development, implementation, and evaluation of nursing curricula and accredited programs nationwide. Framing clinical judgment as an expectation explains the significance to students the moment they begin a fundamentals course. This text was organized initially around what was called blended competencies (cognitive, technical, interpersonal, and ethical/legal) and these were later complemented with QSEN—this represents a history of embedding competencies, so this is not a new concept for this text.

- Competency Outcomes Performance Assessment Model (COPA, 1999/2009)
- QSEN influence: each chapter begins with "Reflective Practice: Cultivating QSEN Competencies"
- American Association of Colleges of Nursing (AACN, 2021): *The Essentials*
- National League for Nursing: *Competencies for Graduates of Nursing Programs* (2012) and *Hallmarks of Excellence in Nursing Education Model* (NLN, 2020)
- Competencies outlined in the revised ANA (2021) *Nursing Scope and Standards of Practice* 4th edition
- Interprofessional Education Collaborative (IPEC, 2016): *Core Competencies for Interprofessional Collaborative Practice*

Four Spheres of Care

The AACN 2021 *Essentials* noted that nursing education has historically emphasized clinical education in acute care. The first edition of our text did exactly that. But we quickly realized that students would be practicing in very diverse settings and that we needed to prepare them for these expanded roles, many in the community. We think you will see increased content in the 10th edition and examples of what *The Essentials* call the four spheres of care: (1) disease prevention/promotion of health and well-being, which includes the promotion of physical and mental health in all patients as well as management of minor acute and intermittent care needs of generally healthy patients; (2) chronic disease care; (3) regenerative or restorative care; and (4) hospice/palliative/supportive care.

Emphasis on Partnering With Patients, Families/Caregivers, and Professional Caregivers

Today, we have witnessed the health care "industry" transform patients to "customers," who buy health care (if they are able) as a commodity in the marketplace. We do not believe that a "customer orientation" serves patients or nurses well. One of our students shared her belief that she owes less to a "customer" and even to a "client" than she does to a "patient." We, therefore, use the term *patient*—in its most positive sense—to designate the recipient of nursing care, whether the patient is an individual, family group, or community. *Family* is defined by the patient and includes anyone they rely on for support, comfort, and care.

Careful attention is paid to directing students to identify, value, and develop the interpersonal skills that will allow them to effectively partner with patients, family, and professional caregivers. This edition highlights interprofessional collaborative practice and nursing strategies for actively engaging patients, family (as identified by the patient), guardians, caregivers, and the public in the development of health goals and strategies to achieve these goals.

Health, Justice, Equity, Diversity, and Inclusion

A health- rather than an illness-orientation provides a framework for presentation of content. This edition includes expanded content on the social determinants of health, health literacy, health disparities, and health equity. Special features such as *Promoting Health, Teaching Tips*, and *Health Literacy* boxes help to highlight this important content and new information on web-based resources for culturally respectful care is provided.

As nurses, we continue to practice in a health system plagued by disparities. As authors, we are committed to making health care work for everyone, especially the most vulnerable. While previous editions of this text highlighted the social determinants of health and offered practical resources for assessing special needs, for advocating for vulnerable individuals and groups, and for designing effective strategies to promote equity, the 10th edition heeds nursing leaders' call to prepare nurses who are anti-racist and highlights ANA's Standard on Respectful and Equitable Practice. New Vulnerable Populations Alerts are valuable additions to this edition.

Care has been taken to communicate that both nurses and patients may identify their gender and/or sexual orientation on a spectrum, and that they come from every racial and ethnic background and socioeconomic group. When not addressing a specific case, we have tried to avoid gender distinctions in personal pronouns. We also very intentionally differentiate the concepts of gender identity, gender expression, sexual identity, sexual orientation, and biological sex or sex assigned at birth—we focus on saying what we mean and only what is germane to providing nursing care. Every effort has been made to highlight diversity, equity, and inclusion themes and to use recommended language that honors each individual we describe. We understand that this language is changing rapidly and anticipate future modifications.

Health and Self-Care of the Nurse

If the pandemic taught us anything, it underscored the critical importance of the health and well-being of caregivers. In this edition, you will find a new Nurse Self-Care alert, enhanced content on wellness strategies and resilience.

Compassion Fatigue and Burnout

In our efforts to instill a commitment to service and excellence in our graduates, we have often failed as educators to address appropriate work/life balance challenges. Our ANA Code of Ethics continues to instruct nurses that their primary commitment is to patients, while at the same time reminding them they have duties to self. We directly address these challenges of commitment in the 10th edition with expanded content in Chapter 1, new Nurse Self-Care alerts throughout the text, and highlighted resources for self-care.

Climate Change and Environmental Health

ANA's *Nursing: Scope and Standards of Practice* (2021) includes Standard 17, Resource Stewardship and 18, Environmental Health. The 10th edition added new content on environmental health, and the United Nations Sustainable Development Goals offers students practical strategies and climate actions they can use to partner in their communities to help limit global warming and take care of our planet.

Attention to Care of the Older Person

Because the age of the population is increasing, nurses encounter growing numbers of older patients in all practice settings. Chapter 24: Middle and Older Adulthood, the *Focus on the Older Adult* boxes, and general considerations for the older patients that appear within the text aim to sensitize students to the special nursing needs of this population. Readers of the 10th edition will find expanded information related to health disparities; a discussion of

cascade iatrogenics; technology-based and online resources for older adults; expanded information on developmental and disability considerations; and updated guidelines for health-related screenings, examinations, and immunizations for the aging adult.

Healthy Work Environments

This edition addresses current issues of disruptive interpersonal behavior (including incivility and bullying), cyber terror, lateral violence, aggressive behavior, and nurses' use of social media to help readers understand what it takes to have a healthy work environment.

Evidence-Based Practice

Content on research and evidence-based practice has been updated and is included in Unit I for increased emphasis early in the learning experience. See the John Hopkins Evidence-Based Practice Model and new hierarchy of evidence pyramid. The updated feature, *PICOT in Practice: Asking Clinical Questions*, encourages readers to delve into research to solve a clinical question using the PICOT format and guidelines. Updated *Research in Nursing: Bridging the Gap to Evidence-Based Practice* boxes, appearing throughout the book, promote the value of research, and apply its relevance to nursing practice. Students are challenged to become informed participants in, and consumers of, clinical research. To that end, students can explore additional research in nursing journal articles provided for each chapter on our website (http://thePoint.lww.com/Taylor10e).

Focus on Nursing Skills

Skills are presented in a concise, straightforward, and simplified format that is intended to facilitate competent performance of nursing skills. A scientific rationale accompanies each nursing action; many color photographs and illustrations further reinforce mastery. Students are encouraged to think critically about the skills they are performing. *Delegation Considerations* assist students and graduate nurses in developing the critical decision-making skills necessary to transfer responsibility for the performance of an activity to another individual and to ensure safe and effective nursing care. The *Developing Clinical Reasoning and Judgment* features support development of clinical reasoning and clinical judgment skills. *Unexpected Situations and Related Interventions* are included to help students think critically about the skills they are performing. *Special Considerations*, including modifications and age and community-based care considerations, are given where appropriate and guide students to implement person-centered interventions. Also included are *Documentation Guidelines* and *Sample Documentation* to help students learn what and how to document when performing skills.

Hand Hygiene icons alert students to this crucial step that is the best way to prevent the spread of microorganisms (see the *How to Use Fundamentals of Nursing* section on pp. xvi–xxv).

Patient Identification icons alert students to this critical step ensuring the right patient receives the intervention to help prevent errors (see the *How to Use Fundamentals of Nursing* section on pp. xvi–xxv).

Focus on Community and Expanded Nursing Roles

Patients today spend fewer days in the hospital, are frequently transferred both within the hospital and between health care institutions and home, and need to rely on rapidly proliferating community-based health care resources. Content on accountable care organizations, medical homes, and medical neighborhoods, as well as content on the new roles for nurses (nurse coach, clinical nurse leader, nurse navigator, and nurse care coordinator) highlight both traditional and innovative care in institutional and community-based practice settings. New content includes the Robert Wood Johnson Foundations Healthy Communities resources and CDC's Division of Community Health (DCH), which created Partnerships to Improve Community Health (PICH).

Focus on Safety

New content highlights today's emphasis on patient safety, including expanded safety information related to children, adolescents, and older adults. The National Academy of Sciences, Engineering and Medicine safety content, 2020 Joint Commission National Patient Safety Goals, and Sentinel Event Statistics are highlighted, and new information is provided on health care–associated infections (HAIs). Safe Patient Handling and Mobility Practices are included in this edition as well as expanded content on patient "hand-offs."

In addition, QSEN boxes and Safety Alerts help students cultivate the Quality and Safety Education for Nurses (QSEN) and blended competencies they will need to serve patients and the public well.

Pandemic Precautions

It is difficult to determine where we will be as the learning package publishes. We obviously strongly recommend following the CDC and your institutional guidelines on use of personal protective equipment and the guidelines to reduce transmission. That said, you will not see masks worn in most photos unless generally indicated. We are hopeful that we will all soon be practicing in a postpandemic world.

Up-to-Date Clinical and Practice Information

Revisions in each clinical chapter will help educators and students remain current. Sample new content includes:

- Updated information from AACN's *Essentials*, the ANA *Nursing: Scope and Standards of Practice* (4th ed.), and National Academy of Sciences, Engineering and Medicine's *The Future of Nursing 2020–2030*
- NEW! Content on diversity, inclusion, and equity that addresses institutional and systemic racism
- AACN's Four Spheres of Care

- Updated content on the Formation of the Professional Identity of the Nurse
- NEW! Feature: Evolving Case Study that reflects the Next Generation NCLEX (NGN)
- NEW! Information on deaths of isolation and despair
- United Nations Sustainable Development Goals
- NEW! Content on climate change and environmental health
- NEW! Content on moral agency, moral distress, moral injury, incivility, and academic ethics
- Challenging topic on reproductive ethics
- Challenging topic on nurse death by suicide
- Leadership's role in preventing clinician burnout
- Pandemic consideration throughout—as applicable
- Community Health needs assessment
- Healthy People 2030
- Updated mental health content
- Comparison of clinical judgment models
- Quick priority assessments
- NEW! Content on triage and nurse triage role
- Updated content on documentation
- New! Information on telehealth, remote monitoring, and mobile care teams
- NEW! Content on disabilities and a vulnerable populations alert
- NEW! Content on adverse childhood experiences
- NEW! Content on treatment of transgender children and gender dysphoria
- Updated content on human suffering and compassionate presence
- Meeting the spiritual needs of millennials
- Expanded information on genetics, genomics, and epigenetics
- Information on SIDS and SUID (sudden unexplained infant death)
- Expanded discussion of childhood obesity
- Dangers associated with substance use disorder and opioid use disorder
- Expanded information on multiple drug–resistant organisms; use of care bundles or evidence-based protocols; the impact of staffing issues on HAIs
- ANA recommendations on reducing use of restraints
- Periop: "never events," new guidelines for preop fasting and skin prep, and operative positioning recommendations by AORN (Association of periOperative Registered Nurses)
- The Joint Commission universal protocol and "time-out"
- Noise prevention in acute care and ICU
- Expanded content on self-care including new information on mindfulness and a new Nurse Self-Care alert
- The Joint Commission Sentinel Alert on fatigue in health care workers
- Role of Pain Resource Nurse
- New content on biological sex, biological sex identification, and sexual orientation
- SBAR/SBARR/I-SBAR-R communication to improve patient "hand-offs" from one professional caregiver to another
- CUS communication tool to assist in effective communication related to patient safety concerns
- Updated ANA Principles of Delegation
- Updated content on maintaining privacy, confidentiality, and professionalism and the use of social media
- Content on Bedside Reports and Purposeful rounding
- Updated medication math calculations designed to highlight common errors
- Enhanced content on the opioid crisis including new standards by The Joint Commission such as the Prescription Drug Monitoring Program (PDMP), individualizing and performing a comprehensive pain assessment, and current pain management guidelines
- Inclusion of new terms and treatments associated with pressure injuries and wounds
- Cardiopulmonary resuscitation (CPR) for the mind: Facts About Mental Health First Aid

Self-Assessment Guides

Fundamentals of Nursing has always encouraged students to be independent learners. Checklists throughout the text (e.g., blended skills assessment, use of nursing process, health assessments) allow students to evaluate their personal strengths and limitations and develop related learning goals.

SPECIAL FEATURES

Many features appear throughout the text to help students grasp important content. Refer to the "How to Use *Fundamentals of Nursing*" section on pages xiii–xxii to learn more about them.

COMPREHENSIVE, INTEGRATED FUNDAMENTALS AND SKILLS SOLUTIONS

We are delighted to offer an expanded suite of digital solutions that offer instructors and students using the Taylor, Lynn, and Bartlett Fundamentals and Skills suite of content everything they need to conduct their fundamentals course and integrate clinical skills learning throughout the curriculum. To learn more about any solution with the Taylor suite, please contact your local Wolters Kluwer representative.

Lippincott CoursePoint+

Lippincott® CoursePoint+ is an integrated, digital curriculum solution for nursing education that provides a completely interactive experience geared to help students understand, retain, and apply their course knowledge and be prepared for practice. The time-tested, easy-to-use, and trusted solution includes engaging learning tools, evidence-based practice, case studies, and in-depth reporting to meet students where they are in their learning, combined with the most trusted nursing education content on the market to help prepare students for practice. This easy-to-use digital learning solution of *Lippincott® CoursePoint+*, combined with unmatched support, gives instructors and students everything they need for course and curriculum success!

Lippincott® CoursePoint+ includes:

- An interactive eBook provides on-demand access to the full contents of this textbook.
- Leading content provides a variety of learning tools to engage students of all learning styles.

- A personalized learning approach gives students the content and tools they need at the moment they need it, giving them data for more focused remediation and helping to boost their confidence and competence.
- Powerful tools, including varying levels of case studies, interactive learning activities, and adaptive learning powered by PrepU, help students learn the critical thinking and clinical judgment skills to help them become practice-ready nurses.
- Preparation for Practice tools improve student competence, confidence, and success in transitioning to practice.
  - **vSim for Nursing:** Help students be practice-ready with the next generation of vSim for Nursing. The virtual simulation program that so many nursing educators and students rely on has been taken to the next level, providing the most realistic, true-to-life clinical experience. Co-developed by Laerdal Medical and Wolters Kluwer, vSim® for Nursing | Fundamentals provides real-world, evidence-based scenarios written by the National League for Nursing, with built-in point-of-care solutions for reference and remediation. With vSim for Nursing, students can develop their clinical judgment, competence, and confidence. The next generation of vSim for Nursing offers increased realism and fidelity, improved communication, and enhanced opportunities to develop clinical judgment.
  - **Lippincott Advisor for Education:** With over 8,500 entries covering the latest evidence-based content and drug information, Lippincott Advisor for Education provides students with the most up-to-date information possible, while giving them valuable experience with the same point-of-care content they will encounter in practice.
- Unparalleled reporting provides in-depth dashboards with several data points to track student progress and help identify strengths and weaknesses.
- Unmatched support includes training coaches, product trainers, and nursing education consultants to help educators and students implement CoursePoint+ with ease.

Lippincott Skills for Nursing Education

Developed with complete consistency with *Fundamentals of Nursing*, the companion skills title, *Taylor's Clinical Skills for Nursing Education*, 6th Edition, by Pamela Lynn is now available in a new digital solution.

Help student nurses develop skill competency and clinical judgment with ***Lippincott® Skills for Nursing Education***, an unparalleled nursing education skills solution.

Available anytime, anywhere, ***Lippincott Skills for Nursing Education*** is designed specifically to empower nursing faculty and students to support teaching, learning, and reporting on nursing skills across the curriculum. Expert-authored skill instructions, evidence-based rationales, numerous videos, and case studies help the novice nursing student master new skills and confidently prepare for skills lab and clinical settings.

Used alone or integrated with *Lippincott® CoursePoint*, ***Lippincott Skills for Nursing Education*** offers an efficient learning experience backed with tools to monitor and motivate student preparedness and skill competency.

Taylor's Clinical Nursing Skills Collection, authored by Pamela Lynn, EdD, MSN, RN, delivers a robust set of essential skills for the undergraduate nurse and meets the needs of students throughout the curriculum.

ADDITIONAL RESOURCES FOR TEACHING AND LEARNING

To further facilitate teaching and learning, a carefully designed teaching and learning package has been developed to assist faculty and students.

Instructor Resources

Tools to assist you with teaching your course are available in Lippincott CoursePoint+, with select tools available upon adoption of this text on thePoint® at http://thepoint.lww.com/Taylor10e.

- A thoroughly revised and augmented **Test Generator** contains more than 2900 NCLEX-style questions mapped to chapter learning outcomes.
- An extensive collection of materials is provided for each book chapter:
  - **Lesson Plans** outline learning outcomes and identify relevant resources from the robust instructor and student resource packages to help you prepare for your class.
  - **Pre-Lecture Quizzes** (and answers) allow you to check students' reading.
  - **PowerPoint Presentations** provide an easy way to integrate the textbook with your students' classroom experience; multiple-choice and true/false questions are included to promote class participation.
  - **Guided Lecture Notes** are organized by outcome and provide corresponding PowerPoint slide numbers to simplify preparation for lecture.
  - **Discussion Topics** (and suggested answers) can be used in the classroom or in online discussion boards to facilitate interaction with your students.
  - **Assignments** (and suggested answers) include group, written, clinical, and Web assignments to engage students in varied activities and assess their learning.
  - **Case Studies** with related questions (and suggested answers) give students an opportunity to apply their knowledge to a client case similar to one they might encounter in practice.
- Sample **Syllabi** are provided for one- and two-semester courses.
- **NEW! AACN Essentials Content Mapping**, which are competency-based and include expected competencies for entry-level nurses and advanced-level nurses.
- A **QSEN Competency Map** identifies content and special features in the book related to competencies identified by the QSEN Institute.
- An **Image Bank** lets you use the photographs and illustrations from this textbook in your course materials.
- Access to all **Student Resources** is provided so that you can understand the student experience and use these resources in your course as well.

Student Resources

An exciting set of learning resources is available to students using Lippincott CoursePoint+. Select resources are available on thePoint® at http://thepoint.lww.com/Taylor10e using the codes printed in the front of students' textbooks.

- Interactive learning resources appeal to a variety of learning styles.
  - **Concepts in Action Animations** bring physiologic and pathophysiologic concepts to life.
  - **Practice & Learn Case Studies** present case scenarios and offer interactive exercises and questions to help students apply what they have learned.
  - **Watch & Learn Videos** reinforce select skills from the textbook and appeal to visual and auditory learners.
- **Journal Articles** offer access to current articles relevant to each chapter and available in Wolters Kluwer journals to familiarize students with nursing literature.

Study Guide

A comprehensive study aid for reviewing key concepts, *Study Guide for Fundamentals of Nursing: The Art and Science of Person-Centered Care*, 10th Edition, has been thoroughly revised and presents a variety of exercises, including case studies and practice NCLEX-style questions, to reinforce textbook content and enhance learning.

Skill Checklists

Skill Checklists for Fundamentals of Nursing: The Art and Science of Person-Centered Care, 10th Edition (included in Lippincott CoursePoint+ or available in print) offers step-by-step forms to evaluate student competency for the skills included in this textbook. A more complete list of skills and associated skill checklists is available in *Lippincott Skills for Nursing Education*.

Lippincott DocuCare

Available for separate purchase, Lippincott® DocuCare combines Web-based academic EHR simulation software with clinical case scenarios, allowing students to learn how to use an EHR in a safe, true-to-life setting, while enabling instructors to measure their progress. Lippincott DocuCare's nonlinear solution works well in the classroom, simulation lab, and clinical practice.

HOW TO USE
FUNDAMENTALS OF NURSING

Dear Student,

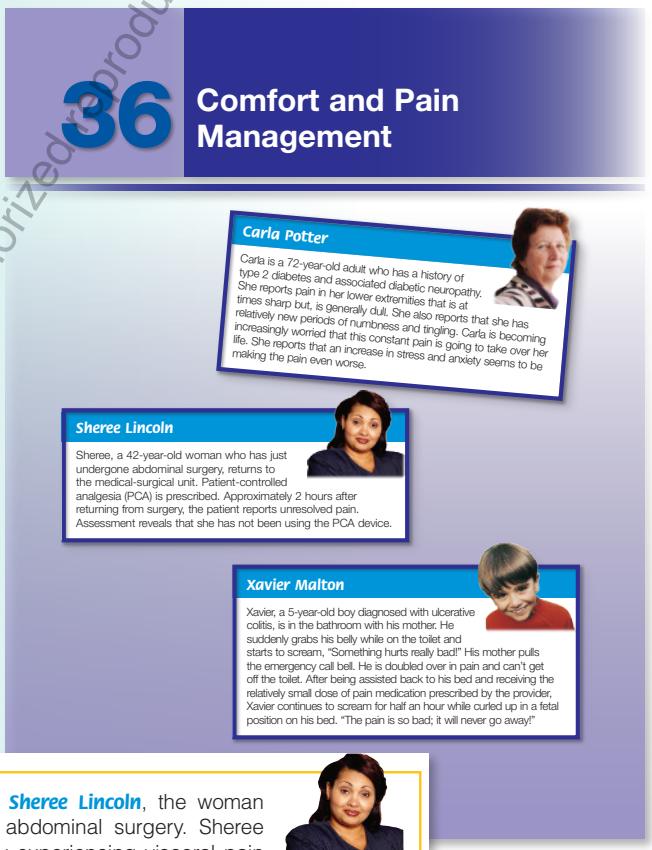
Congratulations on choosing an exciting and rewarding profession! All of us who have been part of the writing of this text welcome you warmly to our profession and value our role as your guides to excellent practice. We have tried in this text to present in a readable and enjoyable format, the scientific and technical knowledge you will need to design safe and effective nursing care. But we want to do more than prepare you intellectually and technically. You will also find narratives that will teach you valuable interpersonal skills and content specifically designed to prepare you to meet the ethical and legal challenges in today's practice. So take a deep breath and dig in. Your patients are counting on you and so are we!

Carol Taylor, Pamela Lynn, and Jennifer L. Bartlett

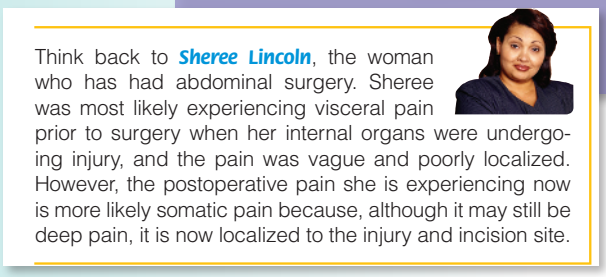
HERE'S HOW TO GET STARTED!

FOLLOW THE STORY LINES!

Get to know your patients by reading the chapter opening **Case Scenarios**.



Narratives throughout the chapter refer to these scenarios, helping you to consider how the chapter content applies to care of real patients. For your convenience, a list of these case scenarios and threaded narratives, along with their location in the book, appears in the "Case Studies in This Book" section later in this front matter.



NEWLY UPDATED! Unfolding Patient Stories, written by the National League for Nursing, are an engaging way to begin meaningful conversations in the classroom. These vignettes, which unfold in two parts each and are interspersed throughout the text, feature patients from Wolters Kluwer's *vSim Fundamentals* (codeveloped by Laerdal Medical) and DocuCare products; however, each Unfolding Patient Story in the book stands alone, not requiring purchase of these products. For your convenience, a list of these case studies, along with their location in the book, appears in the "Case Studies in This Book" section later in this front matter.

Unfolding Patient Stories: Marvin Hayes • Part 1

Marvin Hayes, a 43-year-old male, is being seen at the clinic. He has a family history of colorectal cancer. What questions can the nurse ask to identify disturbances in bowel elimination? What are the signs and symptoms of colon and rectal cancer? What patient education would the nurse provide when orders are written to obtain a stool sample and schedule a colonoscopy? (Marvin Hayes' story continues in Chapter 42.)

Care for Marvin and other patients in a realistic virtual environment: ***vSim*** *for Nursing* (thepoint.lww.com/vSimFunds). Practice documenting these patients' care in DocuCare (thepoint.lww.com/DocuCareEHR).

GET READY TO LEARN!

Before reading the chapter content, read the **Learning Outcomes**. These roadmaps help you understand what is important and why. Create your own learning outline or use them for self-testing.

Learning Outcomes

After completing the chapter, you will be able to accomplish the following:

1. Explain the components, purposes, and types of health assessments.
2. Prepare the patient and the environment for a health assessment.
3. Conduct a health history.
4. Use the techniques of inspection, palpation, and auscultation appropriately during a physical assessment.
5. Conduct a physical assessment in a systematic manner.
6. Document health assessment findings in a concise, descriptive, and legally appropriate manner.
7. Describe nursing responsibilities related to diagnostic and laboratory testing as part of health assessment.

NEW! Nursing Concepts list in the chapter opener highlight connections to nursing concepts for ease of identification.

Nursing Concepts

- Assessment
- Clinical Decision Making/Clinical Judgment
- Communication
- Therapeutic Communication

Key Terms are bolded throughout the narrative; explanations to help you become familiar with new vocabulary are presented online at https://thepoint.lww.com/taylor10e

STAY CURRENT ON SAFETY, TECHNOLOGY, AND LEGAL DEVELOPMENTS!

QSEN boxes highlight content related to QSEN competencies, which are key to ensuring students understand how to avoid harming patients and providers with best practice in individual performance and facility wide.

QSEN PATIENT-CENTERED CARE

The health practices and beliefs of patients and/or family members/caregivers related to fever and other symptoms may be influenced by cultural beliefs and practices. Culturally and ethnically sensitive strategies must be considered when providing interventions and patient education related to fever.

Technology Alerts feature new technology in development that will likely be in place by the time students are practicing. By understanding as students that technology is always changing, they will be better prepared to embrace change later.

Technology Alert

One system, ON-Q Pain Relief System, involves administration of local anesthetic medication directly at the affected surgical site. The benefit of this temporary system is earlier mobility and effective pain relief, with fewer side effects because of decreased opioid use postoperatively (Cinar et al., 2021; Porter et al., 2021).

Legal Alerts highlight important laws that affect nurses and are applicable to nursing practice.

Legal Alert

Patients have the right to be treated with dignity and to be involved in developing their pain management plan of care.

LEARN TO PRACTICE WELLNESS STRATEGIES AND SELF-CARE!

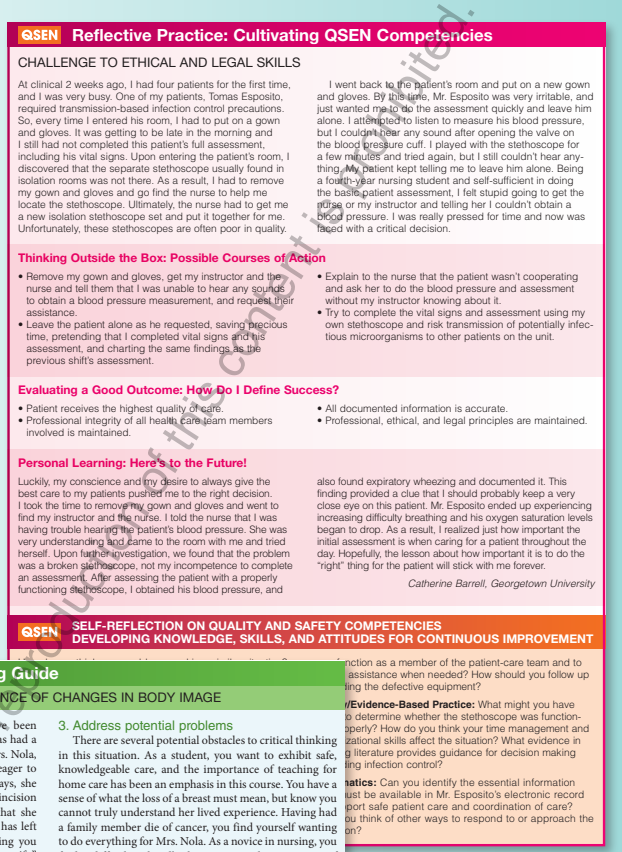
NEW! Nursing Self-Care Alerts remind us that we cannot be there for others if we do not take care of ourselves.

Nursing Self-Care Alert

Although the benefits of wearing a mask far outweighed the potential risks, nurses (and other members of the interprofessional health care team) had to take extra measures during the pandemic to protect their skin from breakdown due to prolonged use of masks and other necessary PPE.

DEVELOP CRITICAL THINKING, CLINICAL REASONING, AND CLINICAL JUDGMENT SKILLS!

Read **Reflective Practice** boxes and discover how other nursing students confront challenging situations (cognitive, technical, interpersonal, or ethical/legal). What course of action did the student take? Would you do the same? Reflect on how you would respond to similar situations while developing QSEN competencies.



QSEN **Reflective Practice: Cultivating QSEN Competencies**

CHALLENGE TO ETHICAL AND LEGAL SKILLS

At clinical 2 weeks ago, I had four patients for the first time, and I was very busy. One of my patients, Tomas Esposito, required transmission-based infection control precautions. So, every time I entered his room, I had to put on a gown and gloves. It was getting to be late in the morning and I still had not completed this patient's full assessment, including his vital signs. Upon entering the patient's room, I discovered that the separate stethoscope usually found in isolation rooms was not there. As a result, I had to remove my gown and gloves and go find the nurse to help me locate the stethoscope. Ultimately, the nurse had to get me a new isolation stethoscope set and put it together for me. Unfortunately, these stethoscopes are often poor in quality.

I went back to the patient's room and put on a new gown and gloves. By this time, Mr. Esposito was very irritable, and just wanted me to do the assessment quickly and leave him alone. I attempted to listen to measure his blood pressure, but I couldn't hear any sound after opening the valve on the blood pressure cuff. I played with the stethoscope for a few minutes and tried again, but I still couldn't hear anything. My patient kept telling me to leave him alone. Being a fourth-year nursing student and self-sufficient in doing the basic patient assessment, I felt stupid going to get the nurse or my instructor and telling her I couldn't obtain a blood pressure. I was really pressed for time and now was faced with a critical decision.

Thinking Outside the Box: Possible Courses of Action

- Remove my gown and gloves, get my instructor and the nurse and tell them that I was unable to hear any sounds to obtain a blood pressure measurement, and request their assistance.
- Leave the patient alone as he requested, saving precious time, pretending that I completed vital signs and his assessment, and charting the same findings as the previous shift's assessment.
- Explain to the nurse that the patient wasn't cooperating and ask her to do the blood pressure and assessment without my instructor knowing about it.
- Try to complete the vital signs and assessment using my own stethoscope and risk transmission of potentially infectious microorganisms to other patients on the unit.

Evaluating a Good Outcome: How Do I Define Success?

- Patient receives the highest quality of care.
- Professional integrity of all health care team members involved is maintained.
- All documented information is accurate.
- Professional, ethical, and legal principles are maintained.

Personal Learning: Here's to the Future!

Luckily, my conscience and my desire to always give the best care to my patients pushed me to the right decision. I took the time to remove my gown and gloves and went to find my instructor and the nurse. I told the nurse that I was having trouble hearing the patient's blood pressure. She was very understanding and came to the room with me and tried herself. Upon further investigation, we found that the problem was a broken stethoscope, not my incompetence to complete an assessment. After assessing the patient with a properly functioning stethoscope, I obtained his blood pressure, and also found expiratory wheezing and documented it. This finding provided a clue that I should probably keep a very close eye on this patient. Mr. Esposito ended up experiencing increasing difficulty breathing and his oxygen saturation levels began to drop. As a result, I realized just how important the initial assessment is when caring for a patient throughout the day. Hopefully, the lesson about how important it is to do the "right" thing for the patient will stick with me forever.

Catherine Barrell, Georgetown University

QSEN **SELF-REFLECTION ON QUALITY AND SAFETY COMPETENCIES DEVELOPING KNOWLEDGE, SKILLS, AND ATTITUDES FOR CONTINUOUS IMPROVEMENT**

Learn how careful thinking can change patient outcomes. Like nursing care, careful thinking and reflective practice follow a process. Study the **Focused Critical Thinking Guides** to gain skill in working through the step-by-step critical thinking process.

33-1 Focused Critical Thinking Guide

WOUND CARE: PROMOTING ACCEPTANCE OF CHANGES IN BODY IMAGE

During both clinical days in 1 week, you have been assigned to care for a middle-aged woman who has had a breast removed because of cancer. The patient, Mrs. Nola, is an attractive, usually cheerful woman who is eager to get better and return home. However, on both days, she turned her head away and would not look at the incision when her dressing was changed. She tells you that she "just can't stand to look at herself." Her husband has left the room during the dressing changes after telling you that "it makes me sick to see what happened to my wife." Mrs. Nola is to be discharged to her home the next day and needs to learn how to provide self-care for her wound. What do you do?

1. Identify goal of thinking

Determine the most effective way of ensuring wound care while also assisting Mrs. Nola in accepting her altered self-image.

2. Assess adequacy of knowledge

Pertinent circumstances: The diagnosis of cancer was made only 2 weeks before the surgical removal of the breast. The patient is to be discharged to her home the next day. The wound from her mastectomy has not completely healed and will require dressing changes for another 3 or 4 days. Mrs. Nola has had a disfiguring surgery and is coping with not only a change in body image, but also the diagnosis of cancer. She has never been seriously ill or had surgery. She has a strong, loving relationship with her husband, but he is unable to deal with the physical disfigurement at this time.

Prerequisite knowledge: Before you decide what to do in this situation, you need to know how Mrs. Nola is coping with her diagnosis of cancer. If she is still in denial about the disease, it is likely that she is also denying the surgical procedure and the changes in her body. You will need to review responses to the diagnosis of cancer as well as the stages of grief and loss. You will have to learn what her sources of support are and how she can best access and use them. You will need to assess how best to help her achieve wound care in the face of her continued refusal even to look at the wound.

Room for error: If she is forced to look at the wound or made to feel inadequate because of her inability to do so, she may feel threatened and may become angry in response to the perceived threat and retreat even further.

Time constraints: Some decision about wound care must be made before her discharge the next day.

3. Address potential problems

There are several potential obstacles to critical thinking in this situation. As a student, you want to exhibit safe, knowledgeable care, and the importance of teaching for home care has been an emphasis in this course. You have a sense of what the loss of a breast must mean, but know you cannot truly understand her lived experience. Having had a family member die of cancer, you find yourself wanting to do everything for Mrs. Nola. As a novice in nursing, you find it difficult to handle these emotional components of patient care and find yourself wanting to focus objectively on the task at hand and scold both the patient and her husband for being so silly about something as simple as a dressing change.

4. Consult helpful resources

You must first appreciate the loss and grief Mrs. Nola is experiencing, and you must then relate that to her response to self-care of the wound. Your best source of information about her coping methods and sources of personal strength is Mrs. Nola herself. You also discuss the most effective way of providing wound care at home with your instructor and the case manager for Mrs. Nola.

5. Critique judgment/decision

After talking to Mrs. Nola, your instructor, and the case manager, you mutually agree that Mrs. Nola cannot be hurried into acceptance of her medical diagnosis or her body changes. The case manager consults with Mrs. Nola's provider, who writes a prescription for a home health care nurse to visit for the next 4 days and complete the dressing change. After talking with Mrs. Nola, you identify that she is still very much in denial. You discuss with her the possibility of having a visitor from "Reach to Recovery," a support group for women with breast cancer who have had a mastectomy. Mrs. Nola tells you that she thinks she would like to talk to someone with the same diagnosis, and you call a referral for her. When you tell Mrs. Nola that a home health care nurse will be visiting her for the first few days at home to change her dressing and ensure Mrs. Nola can appropriately change the dressing herself, tears fill her eyes. She says, "I am so scared—I just don't know what to do." You realize that insisting that Mrs. Nola do her own dressing (in this moment) would have been extremely stressful for her. Focusing solely on the task would have been perceived as dismissive and could have negatively impacted on the trusting relationship you were trying to form with the patient. When you share the situation in postconference, your clinical group supports your clinical judgment.

Challenge yourself! Use the new knowledge you've gained to "think through" learning exercises in the **Developing Clinical Reasoning and Clinical Judgment** section at the end of each chapter.

DEVELOPING CLINICAL REASONING AND CLINICAL JUDGMENT

1. Identify developmental challenges for five of your family members or friends at different ages across the lifespan. Explain why meeting developmental needs is an essential role of nursing.
2. Compare and contrast the psychosocial theories of Erikson and Gould. Are the concepts in these theories relevant today? If yes, explain why. If no, what would you delete and what would you add?

NEW! Work through the **Evolving Case Studies** to help develop and refine your clinical reasoning and clinical judgment skills.

EVOLVING CASE STUDY 33-1

Scenario: Sam Bentz, a 56-year-old admitted to the hospital for management of nonhealing wounds and an infection mentions, "Last time I was here, my skin got really irritated and I developed several skin wounds."

QUESTION r/t CUES: Based on the patient's reason for admission, what initial question is the most important for the nurse to ask?

A. "Can you tell me about your wounds and what prompted you to come to the hospital?"
B. "Can you tell me why you were here for your last admission?"
C. "Is this admission due to your lack of follow-through after your last discharge?"
D. "Can you define irritated for me? Was this your interpretation or your provider's?"

Scenario: You note that Sam is 5 ft 4 in tall and weighs more than 300 lb with a BMI of >51.5, which means Sam

Scenario: The nurse sits down next to Sam, reframes, and asks the question again. Sam apologizes for reacting and admits that they felt "judged and fat-shamed" their last admission. Sam relaxes and begins describing their nonhealing wounds. Seizing the opportunity, the nurse performs an assessment and finds Sam's legs to be edematous, red, and macerated; weeping serous fluid; rough; and painful to the touch. There are also three large, round, deep, yellow, necrotic nonhealing wounds on the left lower leg near the ankle. When the nurse turns Sam to the side, the nurse notes a large, foul-smelling sacral wound that is covered with what appears to be an old duoderm dressing.

QUESTION r/t PRIORITIZING HYPOTHESIS: Based on the objective and subjective assessment of this patient, which priority problem should the nurse identify to guide the plan of care?

MAKE REFLECTIVE PRACTICE AN ESSENTIAL PART OF YOUR PROFESSIONAL PRACTICE!

Reflective Practice Leading to Personal Learning sections conclude most chapters. **Reflective practice** is a purposeful activity that leads to action, improvement of practice, and better patient outcomes. It is about looking at an event, understanding it, and learning from it. Learning from reflection is not automatic; it requires a deeper understanding of how and why reflection contributes to the competence of the effective nurse. Start your practice by concluding each caregiving experience with a moment of reflection that identifies and celebrates the nursing skills used and targets skills that still need to be developed. This practice can keep you from feeling overwhelmed by everything that remains to be mastered and yet strongly motivated to learn new skills.

REFLECTIVE PRACTICE LEADING TO PERSONAL LEARNING

Remember that the goal of reflective practice is to look at an experience, understand it, and learn from it. As you begin to develop expertise in implementing measures related to complementary and integrative health practices, reflect on your experiences—successes and failures—in order to improve your practice. How can you do it better next time? What did you learn today that can help you tomorrow? Begin your reflection by paying close attention to the following while performing interventions related to CHAs and integrative health care and providing nursing care:

- Were you aware of any cultural and/or ethnic beliefs or practices that may have influenced the health practices and beliefs of patients and/or family members/caregivers related to CHA/IH? Were you aware of any stereotypes or prejudices that might have negatively influenced the clinical encounter? If so, how did you address these?
- Was the patient/family/caregiver participation in the
ight you have bet-
caregivers? Did the
l, caring, and compe-
t data?
g, personal experi-
nake decisions and

MASTER NURSING PROCESS!

Throughout the clinical chapters, you will find many ways to help you visualize and understand the nursing process.

Follow the step-by-step organization of the **Nursing Process** section to understand nursing responsibilities.

NURSING PROCESS FOR COMFORT AND PAIN MANAGEMENT

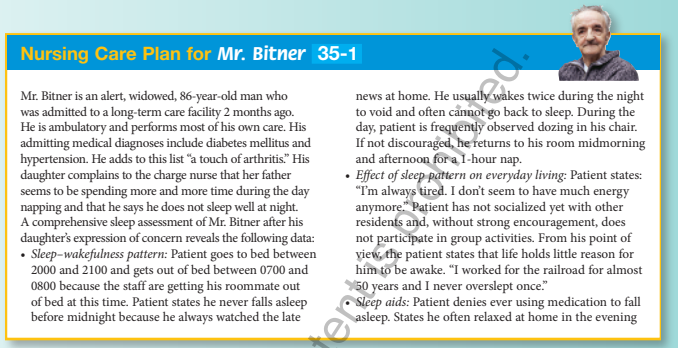
Assessing

Because the pain experience is unique to each person, the nurse who wants to help the patient achieve comfort and pain control needs sophisticated pain assessment skills. Assessing all factors that affect the pain experience—psychological, sociocultural, spiritual, and physiologic—is essential. Pain is complex and difficult to interpret and requires a reliable assessment tool.

Routine Pain Assessment

In an effort to improve patients' quality of life and make pain management a priority, the American Pain Society (1995) encouraged caregivers to include assessment for pain as the fifth vital sign. Routine measurement of vital signs accompanied by a pain assessment was thought to raise awareness of the existence of pain, place additional emphasis on optimizing pain relief, and move patients more quickly toward comfort and recovery. However, this framing led to the problematic interpretation that pain needed to be

Examine the **Nursing Care Plan** box (often derived from the chapter opener cases) to discover common health problems and the wide variety of independent and collaborative interventions that nurses manage.

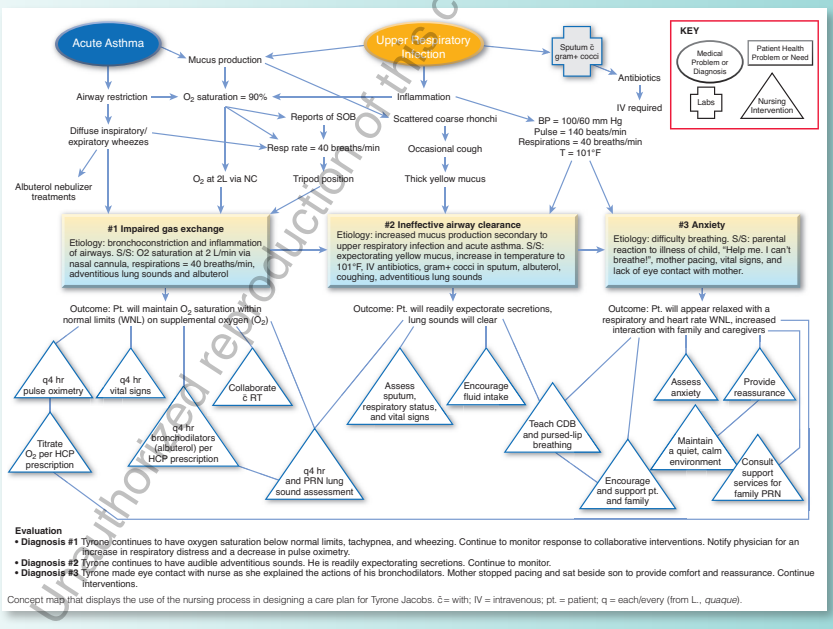


Nursing Care Plan for *Mr. Bitner* 35-1

Mr. Bitner is an alert, widowed, 86-year-old man who was admitted to a long-term care facility 2 months ago. He is ambulatory and performs most of his own care. His admitting medical diagnoses include diabetes mellitus and hypertension. He adds to this list "a touch of arthritis." His daughter complains to the charge nurse that her father seems to be spending more and more time during the day napping and that he says he does not sleep well at night. A comprehensive sleep assessment of Mr. Bitner after his daughter's expression of concern reveals the following data:

- *Sleep–wakefulness pattern:* Patient goes to bed between 2000 and 2100 and gets out of bed between 0700 and 0800 because the staff are getting his roommate out of bed at this time. Patient states he never falls asleep before midnight because he always watched the late news at home. He usually wakes twice during the night to void and often cannot go back to sleep. During the day, patient is frequently observed dozing in his chair. If not discouraged, he returns to his room midmorning and afternoon for a 1-hour nap.
- *Effect of sleep pattern on everyday living:* Patient states: "I'm always tired. I don't seem to have much energy anymore." Patient has not socialized yet with other residents and, without strong encouragement, does not participate in group activities. From his point of view, the patient states that life holds little reason for him to be awake. "I worked for the railroad for almost 50 years and I never overslept once."
- *Sleep aids:* Patient denies ever using medication to fall asleep. States he often relaxed at home in the evening

View the **Concept Map** (from selected chapter opener cases) to see how the nursing process can be visually represented when planning care for a patient.



Concept map that displays the use of the nursing process in designing a care plan for Tyrone Jacobs. ć = with; IV = intravenous; pt. = patient; q = each/every (from L., *quaque*).

Then use these tools to further develop your nursing process skills:

Focused Assessment Guides with sample interview questions will help strengthen your assessment skills.

Focused Assessment Guide 27-1

HEALTH HISTORY

Factors to Assess	Questions and Approaches
Present health history	"When did you first begin having this problem?" "Did it happen suddenly or slowly?" "Show me exactly where you are having this problem." "What other symptoms have you had with this problem?" "How have you treated this problem?"
Past health history	"Tell me about the childhood illnesses, such as measles or mumps, that you had." "What are you allergic to?" "Describe any accidents, injuries, and surgeries you have had." "What prescribed or over-the-counter medications do you use?" "Do you take any herbal or dietary supplements?" "What is the date of your most recent immunization for tetanus; pertussis; polio; measles; rubella; mumps; influenza; hepatitis A, B, and C; and pneumococcus?"

Examples of Actual and Potential Patient Problems and Needs teach you how to identify and formulate patient problems, and identify needs based on etiologic factors and assessment data.

Examples of Actual or Potential Health Problems and Needs

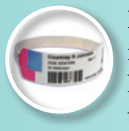
FLUID, ELECTROLYTE, AND ACID–BASE BALANCE

Actual or Potential Health Problems and Needs	Possible Etiologic Factors	Potential Signs and Symptoms
Fluid overload	Renal failure, decreased cardiac output, excessive IV infusion/ fluid intake, excessive sodium intake	• "I've noticed that my wedding ring is tight . . . also my clothes don't fit as well as they used to. I guess I've gained some weight." • Reports dyspnea with exertion, feeling weak and fatigued • Pitting edema in feet, ankles, lower legs, taut, shiny skin • Adventitious breath sounds and increased blood pressure • 10-lb (4.5-kg) weight gain over past month
Fluid imbalance	Inability to obtain or swallow	• Change in mental status

DEVELOP THE NECESSARY SKILLS!

Carefully follow the concise, straightforward, and simplified format of the nursing **Skills** that show both actions and rationales. Special considerations, delegation considerations, and documentation guidelines and samples are also included.

Hand Hygiene icons in Skills and Guidelines for Nursing Care alert students to this crucial step that is the best way to prevent the spread of microorganisms. The term *hand hygiene* applies to both the use of antiseptic handrubs and hand washing with soap and water and should be utilized according to the CDC (2002) guidelines for hand hygiene in health care settings.

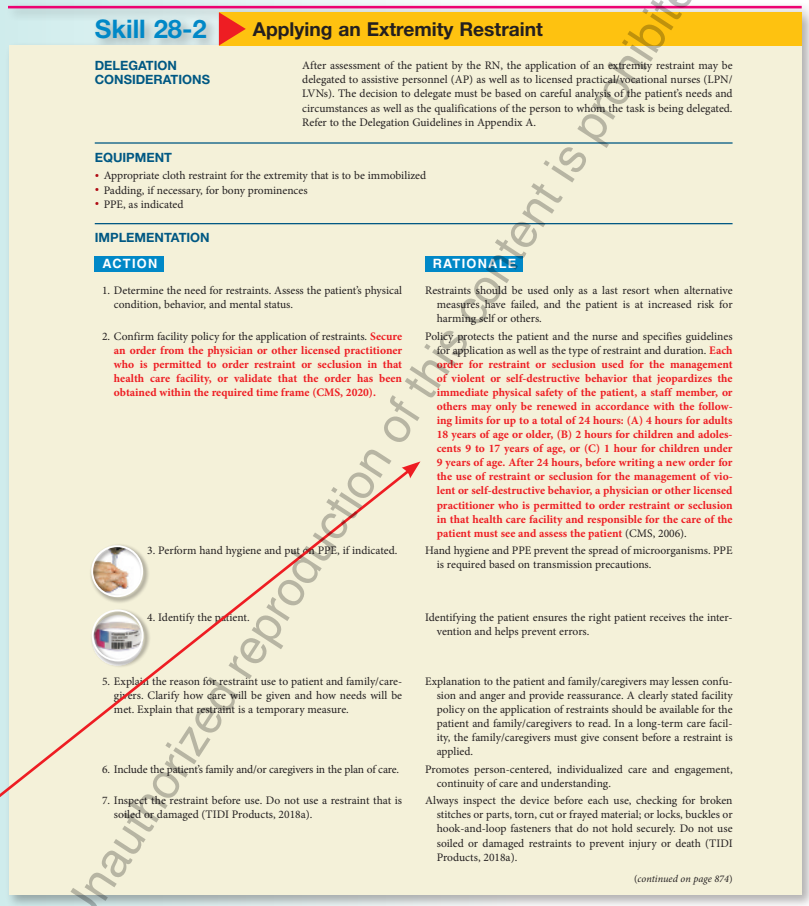


Patient Identification icons in Skills and Guidelines for Nursing Care alert students to this critical step ensuring the right patient receives the intervention to help prevent errors. According to The Joint Commission (2022), the patient should be identified using at least two methods.

Nursing Alerts in Skills and Guidelines for Nursing presented in red text draw attention to crucial information in the steps of the skills.

Guidelines for Nursing Care outline important points to remember in practice and will help you gain competence in performing nursing skills.

NEW! Poetry Nook designed to engage your emotional, spiritual, and artistic sides, provide you the opportunity to integrate learning from your liberal arts coursework in a meaningful, creative way.



Skill 28-2 Applying an Extremity Restraint

DELEGATION CONSIDERATIONS

After assessment of the patient by the RN, the application of an extremity restraint may be delegated to assistive personnel (AP) as well as to licensed practical/vocational nurses (LPN/LVNs). The decision to delegate must be based on careful analysis of the patient's needs and circumstances as well as the qualifications of the person to whom the task is being delegated. Refer to the Delegation Guidelines in Appendix A.

EQUIPMENT

- Appropriate cloth restraint for the extremity that is to be immobilized
- Padding, if necessary, for bony prominences
- PPE, as indicated

IMPLEMENTATION

ACTION	RATIONALE
1. Determine the need for restraints. Assess the patient's physical condition, behavior, and mental status.	Restraints should be used only as a last resort when alternative measures have failed, and the patient is at increased risk for harming self or others.
2. Confirm facility policy for the application of restraints. Secure an order from the physician or other licensed practitioner who is permitted to order restraint or seclusion in that health care facility, or validate that the order has been obtained within the required time frame (CMS, 2020).	Policy protects the patient and the nurse and specifies guidelines for application as well as the type of restraint and duration. Each order for restraint or seclusion used for the management of violent or self-destructive behavior that jeopardizes the immediate physical safety of the patient, a staff member, or others may only be renewed in accordance with the following limits for up to a total of 24 hours: (A) 4 hours for adults 18 years of age or older, (B) 2 hours for children and adolescents 9 to 17 years of age, or (C) 1 hour for children under 9 years of age. After 24 hours, before writing a new order for the use of restraint or seclusion for the management of violent or self-destructive behavior, a physician or other licensed practitioner who is permitted to order restraint or seclusion in that health care facility and responsible for the care of the patient must see and assess the patient (CMS, 2006).
3. Perform hand hygiene and put on PPE, if indicated.	Hand hygiene and PPE prevent the spread of microorganisms. PPE is required based on transmission precautions.
4. Identify the patient.	Identifying the patient ensures the right patient receives the intervention and helps prevent errors.
5. Explain the reason for restraint use to patient and family/caregivers. Clarify how care will be given and how needs will be met. Explain that restraint is a temporary measure.	Explanation to the patient and family/caregivers may lessen confusion and anger and provide reassurance. A clearly stated facility policy on the application of restraints should be available for the patient and family/caregivers to read. In a long-term care facility, the family/caregivers must give consent before a restraint is applied.
6. Include the patient's family and/or caregivers in the plan of care.	Promotes person-centered, individualized care and engagement, continuity of care and understanding.
7. Inspect the restraint before use. Do not use a restraint that is soiled or damaged (TIDI Products, 2018a).	Always inspect the device before each use, checking for broken stitches or parts, torn, cut or frayed material; or locks, buckles or hook-and-loop fasteners that do not hold securely. Do not use soiled or damaged restraints to prevent injury or death (TIDI Products, 2018a).

(continued on page 874)

Guidelines for Nursing Care 27-2

MEASURING PUPILLARY REACTION, SIZE, ACCOMMODATION, AND CONVERGENCE

Pupillary Reaction

- Darken the room.
- Ask the patient to look straight ahead.
- Bring the penlight from the side of the patient's face and briefly shine the light on the pupil (Figure A).
- Observe the pupil's reaction; it normally rapidly constricts (direct response). Also observe pupil size (Figure B).
- Repeat the procedure and observe the other eye; it too normally will constrict (consensual reflex).
- Repeat the procedure with the other eye.

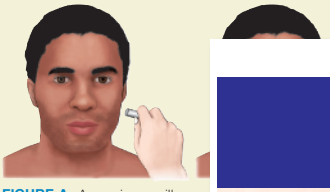


FIGURE A. Assessing pupillary rea

Accommodation

- Hold the forefinger, a pencil, or
  10 to 15 cm (4 to 6 inches) from th

Poetry Nook

Dehiscence

You have come unstitched.

Holes appear on your threadbare abdomen.
Tunnels develop and connect bowel, liver, pancreas.
Enzymes ooze out and digest your skin,
no matter how hard we try to stem the flow.
A jerry-rigged system to
hold together our mistakes.
The stench is overwhelming, ever present

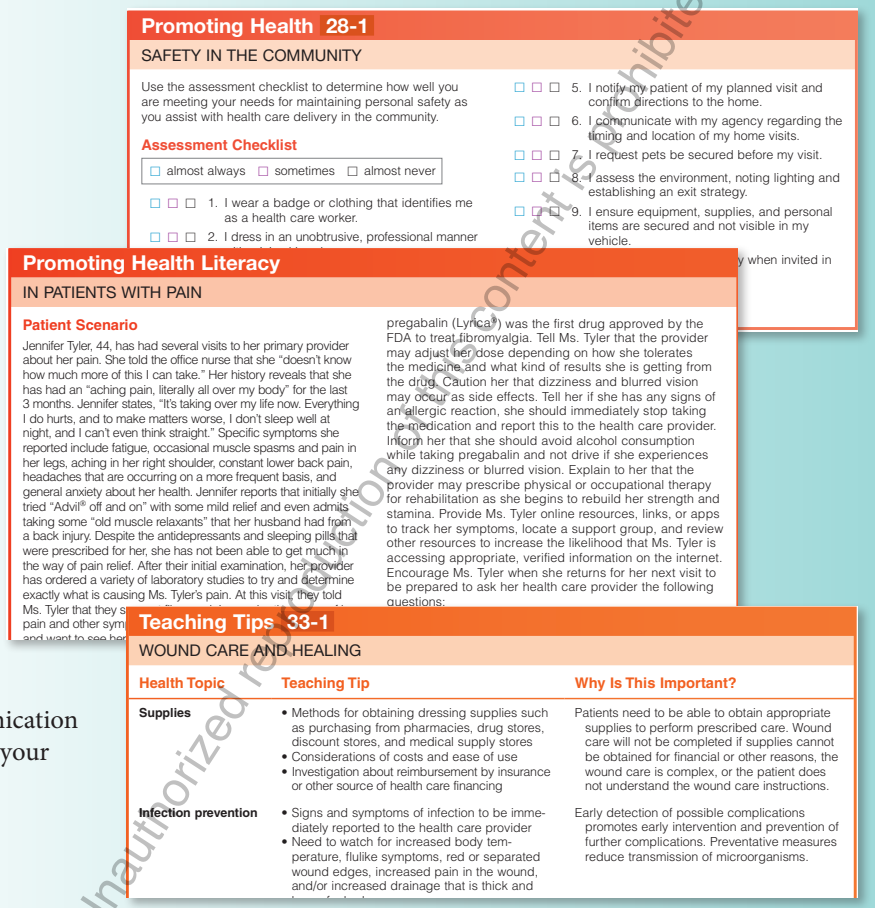
PROMOTE HEALTH AND WELLNESS!

Learn not only to treat illness but also to promote the health and wellness of your patients.

Check out the **Promoting Health** boxes, which include assessment checkpoints for specific health and wellness topics and suggestions for designing a self-care prescription.

Use the **Promoting Health Literacy** boxes to help identify patients and families at risk for poor health outcomes and discover the key questions that all patients should ask their providers.

Develop appropriate nurse–patient communication using **Teaching Tips** boxes to help improve your patient's and family's outcomes.



Promoting Health 28-1

SAFETY IN THE COMMUNITY

Use the assessment checklist to determine how well you are meeting your needs for maintaining personal safety as you assist with health care delivery in the community.

Assessment Checklist

☐ almost always ☐ sometimes ☐ almost never

☐ ☐ ☐ 1. I wear a badge or clothing that identifies me as a health care worker.

☐ ☐ ☐ 2. I dress in an unobtrusive, professional manner

☐ ☐ ☐ 5. I notify my patient of my planned visit and confirm directions to the home.

☐ ☐ ☐ 6. I communicate with my agency regarding the timing and location of my home visits.

☐ ☐ ☐ 7. I request pets be secured before my visit.

☐ ☐ ☐ 8. I assess the environment, noting lighting and establishing an exit strategy.

☐ ☐ ☐ 9. I ensure equipment, supplies, and personal items are secured and not visible in my vehicle.

Promoting Health Literacy

IN PATIENTS WITH PAIN

Patient Scenario

Jennifer Tyler, 44, has had several visits to her primary provider about her pain. She told the office nurse that she "doesn't know how much more of this I can take." Her history reveals that she has had an "aching pain, literally all over my body" for the last 3 months. Jennifer states, "It's taking over my life now. Everything I do hurts, and to make matters worse, I don't sleep well at night, and I can't even think straight." Specific symptoms she reported include fatigue, occasional muscle spasms and pain in her legs, aching in her right shoulder, constant lower back pain, headaches that are occurring on a more frequent basis, and general anxiety about her health. Jennifer reports that initially she tried "Advil® off and on" with some mild relief and even admits taking some "old muscle relaxants" that her husband had from a back injury. Despite the antidepressants and sleeping pills that were prescribed for her, she has not been able to get much in the way of pain relief. After their initial examination, her provider has ordered a variety of laboratory studies to try and determine exactly what is causing Ms. Tyler's pain. At this visit, they told Ms. Tyler that they s… pain and other sym… and want to see her…

pregabalin (Lyrica®) was the first drug approved by the FDA to treat fibromyalgia. Tell Ms. Tyler that the provider may adjust her dose depending on how she tolerates the medicine and what kind of results she is getting from the drug. Caution her that dizziness and blurred vision may occur as side effects. Tell her if she has any signs of an allergic reaction, she should immediately stop taking the medication and report this to the health care provider. Inform her that she should avoid alcohol consumption while taking pregabalin and not drive if she experiences any dizziness or blurred vision. Explain to her that the provider may prescribe physical or occupational therapy for rehabilitation as she begins to rebuild her strength and stamina. Provide Ms. Tyler online resources, links, or apps to track her symptoms, locate a support group, and review other resources to increase the likelihood that Ms. Tyler is accessing appropriate, verified information on the internet. Encourage Ms. Tyler when she returns for her next visit to be prepared to ask her health care provider the following questions:

Teaching Tips 33-1

WOUND CARE AND HEALING

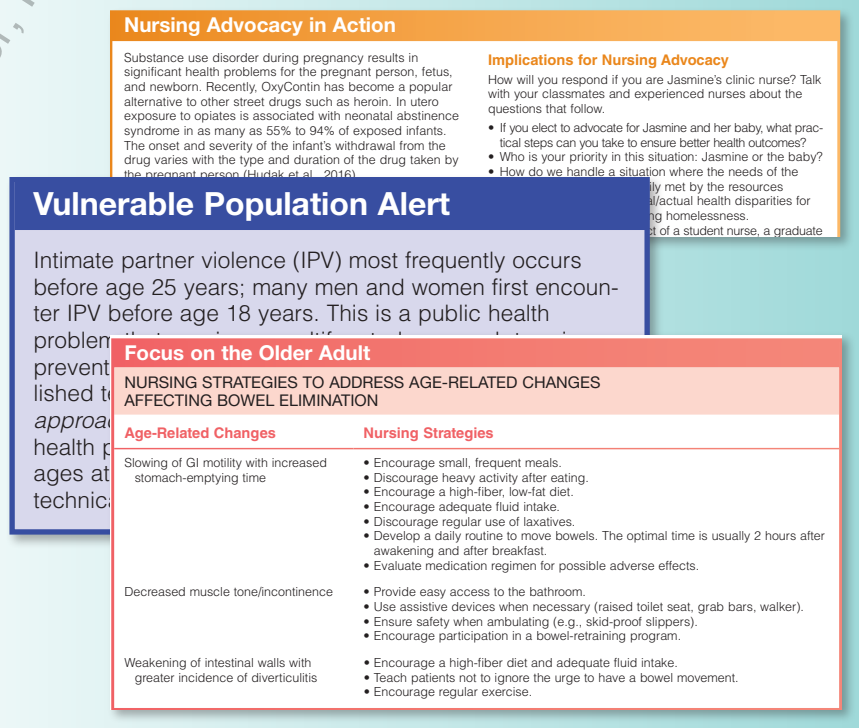
Health Topic	Teaching Tip	Why Is This Important?
Supplies	• Methods for obtaining dressing supplies such as purchasing from pharmacies, drug stores, discount stores, and medical supply stores • Considerations of costs and ease of use • Investigation about reimbursement by insurance or other source of health care financing	Patients need to be able to obtain appropriate supplies to perform prescribed care. Wound care will not be completed if supplies cannot be obtained for financial or other reasons, the wound care is complex, or the patient does not understand the wound care instructions.
Infection prevention	• Signs and symptoms of infection to be immediately reported to the health care provider • Need to watch for increased body temperature, flulike symptoms, red or separated wound edges, increased pain in the wound, and/or increased drainage that is thick and	Early detection of possible complications promotes early intervention and prevention of further complications. Preventative measures reduce transmission of microorganisms.

BE A PATIENT ADVOCATE!

Read the scenarios in the **Nursing Advocacy in Action** boxes and learn how you can advocate for vulnerable individuals.

NEW! Vulnerable Populations alerts will help you identify and individualize care for populations with actual or potential vulnerabilities.

Consider the special needs of the older adult with the **Focus on the Older Adult** boxes.



Nursing Advocacy in Action

Substance use disorder during pregnancy results in significant health problems for the pregnant person, fetus, and newborn. Recently, OxyContin has become a popular alternative to other street drugs such as heroin. In utero exposure to opiates is associated with neonatal abstinence syndrome in as many as 55% to 94% of exposed infants. The onset and severity of the infant's withdrawal from the drug varies with the type and duration of the drug taken by the pregnant person (Hudak et al., 2016).

Implications for Nursing Advocacy

How will you respond if you are Jasmine's clinic nurse? Talk with your classmates and experienced nurses about the questions that follow.

- If you elect to advocate for Jasmine and her baby, what practical steps can you take to ensure better health outcomes?
- Who is your priority in this situation: Jasmine or the baby?
- How do we handle a situation where the needs of the …ly met by the resources …l/actual health disparities for …g homelessness.
- …t of a student nurse, a graduate

Vulnerable Population Alert

Intimate partner violence (IPV) most frequently occurs before age 25 years; many men and women first encounter IPV before age 18 years. This is a public health problem… prevent… lished t… *approa…* health p… ages at… technic…

Focus on the Older Adult

NURSING STRATEGIES TO ADDRESS AGE-RELATED CHANGES AFFECTING BOWEL ELIMINATION

Age-Related Changes	Nursing Strategies
Slowing of GI motility with increased stomach-emptying time	• Encourage small, frequent meals. • Discourage heavy activity after eating. • Encourage a high-fiber, low-fat diet. • Encourage adequate fluid intake. • Discourage regular use of laxatives. • Develop a daily routine to move bowels. The optimal time is usually 2 hours after awakening and after breakfast. • Evaluate medication regimen for possible adverse effects.
Decreased muscle tone/incontinence	• Provide easy access to the bathroom. • Use assistive devices when necessary (raised toilet seat, grab bars, walker). • Ensure safety when ambulating (e.g., skid-proof slippers). • Encourage participation in a bowel-retraining program.
Weakening of intestinal walls with greater incidence of diverticulitis	• Encourage a high-fiber diet and adequate fluid intake. • Teach patients not to ignore the urge to have a bowel movement. • Encourage regular exercise.

GAIN NEW INSIGHTS!

Students, patients, nurses, and family caregivers share their experiences in boxes entitled *Through the Eyes of a Student, Through the Eyes of a Patient*, *Through the Eyes of a Nurse,* and *Through the Eyes of a Family Caregiver*. These real-life stories demonstrate how nursing can make a difference in the lives of patients and their families.

Through the Eyes of a Student

I entered my patient's room, knowing that she had had surgery less than 12 hours before my arrival, and introduced myself. I asked how she was feeling, to which she immediately responded, "I feel really sick. I think I'm going to throw up. I need something—now!" I told her that I would check the medication orders and be back as soon as possible. I walked quickly to the medication administration record, and there it was glaring at me in black and white on the eMAR: "Prochlorperazine, 10 mg IM q 6 hr PRN nausea or vomiting." My mind raced as I thought, "I have never given an IM injection. There has to be something else prescribed." I knew there wasn't. I found my clinical instructor and announced, "My patient needs an IM injection." Given the anxiety I was feeling, everything went surprisingly well as we prepared the medication. I went over the procedure one last time before entering the patient's room.

We approached the patient just in time for her to look

times, wiped the area with alcohol, and asked her if she was ready for the injection. *Big mistake!* She swiftly replied, "No, but get it over with." I took a minute to reassure her (and silently, me) again.

A little voice in my head repeated the words my *technologies* professor had said a million times, "Darting action is the key to a successful injection." So, I aimed at the bull's-eye that appeared in front of my eyes. My hand, which seemed to be moving in slow motion, propelled downward at a 90-degree angle. Secretly, I prayed that I would not hit my own hand. I looked down and it was a bull's-eye, thank goodness, but the needle had not penetrated the muscle! The patient successfully tensed her muscle tight enough to intercept the needle midflight. At that moment, she relaxed, probably because she thought the worst was over, and I pushed the needle into place. I stabilized the syringe at the end of the barrel, and began injecting the prochlorperazine slowly, watching

EXAMINE THE EVIDENCE!

Gain insight into the "why" behind nursing care. Consider **Research in Nursing: Bridging the Gap to Evidence-Based Practice** boxes to discover recent findings in nursing care and relate their relevance to nursing practice.

Research in Nursing

BRIDGING THE GAP TO EVIDENCE-BASED PRACTICE

Stethoscope Hygiene

Stethoscopes, like other patient care equipment, should be cleaned between patients and undergo routine disinfection to prevent the spread of microorganisms. This simple intervention is rarely done despite guideline recommendations (Holleck et al., 2020). What can be done to improve compliance by health care professionals?

Related Evidence

Holleck, J. L., Campbell, S., Alrawili, H., Frank, C., Merchant, N., Rodwin, B., Perez, M. F., Gupta, S., Federman, D. G., Chang, J. J., Vientos, W., & Dembry, L. (2020). Stethoscope hygiene: Using cultures and real-time feedback with bioluminescence-based adenosine triphosphate technology to change behavior. *American Journal of Infection Control, 48*(4), 380–385. https://doi.org/10.1016/j.ajic.2019.10.005

The purpose of this quality improvement project was to determine whether demonstrating what is growing on the stethoscopes of providers via culture or bioluminescence technology alters perceptions and improves compliance with stethoscope hygiene. In addition, the researchers sought to gain a better understanding of the beliefs and the barriers to stethoscope hygiene. Participants included medical students, house staff, and attending physicians on the medical wards at a Department of Veterans Affairs (VA) tertiary care teaching hospital. Beginning with the first week of their medicine inpatient rotations at the VA, providers were given the opportunity to culture their stethoscopes and swab for bioluminescence-based adenosine triphosphate testing before and after disinfection with alcohol pads, alcohol-based hand rub, or hydrogen peroxide disinfectant wipes. Beginning with the second week of their rotations, actual photographic images of stethoscope culture plates before and after disinfection were presented for visual impact at a morning report. Bioluminescence scores of stethoscopes before and after disinfection were provided in real-time and again when presenting images of the stethoscope cultures. Pre-surveys exploring beliefs and barriers to stethoscope hygiene were administered initially prior to any intervention and post-surveys were administered 2 days after presentation of the results. Baseline observations of hand and stethoscope hygiene rates were discreetly recorded at the start of rotations, after presenting the culture images and bioluminescence scores during the second week and during the fourth week of provider rotations. The bacteria isolated, colony-forming units (CFUs), and bioluminescence scores were tracked. This 4-week period was repeated for a total of three cycles. A total of 1,245 observed hand hygiene opportunities showed that compliance improved from 72.5% to 82.3% ($p < .001$). Observed patient–provider encounters (590) revealed no significant change in stethoscope hygiene rates of 10% initially and 5% afterward ($p = .08$), although self-reported rates trended from 56% to 67% postintervention ($p = .06$). Perceptions regarding stethoscope hygiene importance improved 8.5/10 to 9.3/10; $p = .04$. Disinfection with alcohol pads, alcohol-based hand rub, and hydrogen peroxide disinfectant wipes were equivalent in CFU reduction ($p = .21$). The top three barriers to stethoscope hygiene were forgetfulness, time constraints, and limited access to supplies. The authors concluded that showing providers what is growing on their stethoscopes improved "buy in" regarding stethoscope hygiene importance. Objective observations failed to show improvement in stethoscope hygiene rates, but hand hygiene performance improved. The authors noted a significant gap between what providers think they are doing and what they are actually doing.

Relevance to Nursing Practice

Disinfection of patient care equipment, such as stethoscopes, reduces bacteria on the equipment, including the potential to reduce and limit transmission of pathogens. Stethoscopes, like other patient care equipment, should be cleaned between patients and undergo routine disinfection. Nurses and other health care providers need to be aware of the potential barriers to implementation and make a conscious effort to implement equipment hygiene as part of patient care. Facilities must ensure adequate access to disinfection supplies and consider interventions to support use of disinfectants to reduce barriers to implementation.

Read the **PICOT in Practice: Asking Clinical Questions** to think about how you can do a systematic search, formulate questions, and apply evidence-based answers in your practice by following the PICOT model.

PICOT in Practice

ASKING CLINICAL QUESTIONS: ACUPUNCTURE/ACUPRESSURE

Scenario: You are a nurse working with a large maxillofacial surgery group who attended a conference on integrative nursing. One presenter that stood out discussed the benefits of acupuncture/acupressure in managing the gag reflex in patients undergoing dental procedures. Gagging is a common problem encountered during dental treatment, making therapeutic procedures distressing and often difficult or even impossible to perform. One of the surgeons asks if you learned something new at the conference and you discuss the results of the presentation.

The office currently only uses sedatives to facilitate sedation in patient undergoing procedures. You wonder if acupuncture/acupressure compared to sedatives has any benefit in the care of patients "specifically pediatric patients" undergoing procedures.

- **Population:** Children receiving sedation
- **Intervention:** Use of acupuncture/acupressure
- **Comparison:** Use of sedatives
- **Outcome:** Decreased gag reflex
- **Time:** During dental procedures

PICOT Question: Does the use of acupuncture/acupressure by a nonanesthesiologist compared to administration of sedatives result in depression of gag reflex in children undergoing dental treatment and improved experience?

Findings:

1. Ashley, P. F., Chaudhary, M., Lourenço-Matharu, L. (2018). Sedation of children undergoing dental treatment. *Cochrane Database of Systematic Reviews*, (12), CD003877. https://doi.org/10.1002/14651858.CD003877.pub5

Included 50 studies with a total of 3,704 children up to age

for further well-designed and well-reported clinical trials to evaluate other potential sedation agents.

2. Eachempati, P., Kumbargere Nagraj, S., Kiran Kumar Krishanappa, S., George, R. P., Soe, H. H. K., Karanth, L. (2019). Management of gag reflex for patients undergoing dental treatment. *Cochrane Database of Systematic Reviews*, (11), CD011116. https://doi.org/10.1002/14651858.CD011116.pub3

The interventions used to manage gagging include antinausea medicines, sedatives, local and general anesthetics, herbal remedies, behavior therapy and cognitive behavior therapy, acupressure, acupuncture, laser, and prosthetic devices. This systematic review included four trials with 328 people (263 adults and 65 children who were ages 4 years and older). Of the trials reviewed, one compared acupuncture and acupressure (with thumb, device, and sea band) at P6 (point located three finger breadths below the wrist on the inner forearm in between the two tendons) to sham acupuncture and acupressure with and without sedation. One trial compared acupuncture at the P6 point to sham acupuncture. These trials reported both completion of dental procedure and reduction in gagging as their outcomes.

Level of Evidence I: systematic review.

Recommendations: Conscious sedation or moderate sedation is the ability of the patient to independently maintain an open mouth and respond sensibly to verbal commands. In addition, the patient will retain adequate function of protective reflexes such as the gag reflex. There is a fine line between a sedated patient and an anesthetized patient. The ideal sedative agent would reduce anxiety and improve behavior. Oral midazolam probably improves the behavior of children during

PREPARE FOR NCLEX!

Start preparing for NCLEX right from the beginning of your nursing education. The **Practicing for NCLEX** section at the end of each chapter uses the multiple-choice question format to test your knowledge of basic through complex concepts. Answers with rationales are provided for immediate reinforcement.

You may also be interested in Lippincott PassPoint, our adaptive, online NCLEX-preparation tool. Through PassPoint, you can take quizzes accessing thousands of NCLEX-style questions and even take simulated NCLEX questions that adapt to your answers—just like the real exam. To learn more about PassPoint, visit thePoint.lww.com/PassPoint.

Concept Mastery Alerts highlight and clarify the most common misconceptions in nursing fundamentals, as identified by Lippincott's online adaptive learning platform. Our team reviewed data from thousands of fundamentals students across North America to identify the points of confusion for most students to help you learn more effectively.

COORDINATE YOUR STUDY PLAN!

From traditional texts to video and interactive products, the Taylor Fundamentals Suite is tailored to fit every learning style. This integrated suite of products offers students a seamless learning experience you won't find anywhere else.

LIPPINCOTT COURSEPOINT

Powered by PrepU, Lippincott's adaptive learning engine, CoursePoint allows you to study more efficiently and access our digital course content precisely when you need it. With CoursePoint, you can access hundreds of quiz questions for each chapter, as well as a complete electronic version of the textbook and valuable reference and study resources.

PRACTICING FOR NCLEX

1. Thirty-six hours after having surgery, a patient has a slightly elevated body temperature and generalized malaise as well as pain with redness at the surgical site. Which action is most appropriate?
   MAR
   - Acetaminophen 650 mg every 6 hours prn fever
   - Cefazolin (antibiotic) 1 g 1 hour preoperatively
   - Cefazolin 1 g, every 6 hours 3 times, postoperatively

   a. Documenting the findings and continuing to monitor

Concept Mastery Alert

Of the many ways to avoid falls in the acute care setting, the best outcome for a patient at risk for falling is that the patient will not experience a fall and remains free of injury.

ACKNOWLEDGMENTS

This revision is the work of many talented and committed people; we wish to gratefully acknowledge the assistance of all who have contributed in any way to the completion of this project. Our first debt of gratitude is to all the nurse educators and students who have adopted the text and shared with us their experiences in using the teaching and learning package. We are deeply grateful for their revision suggestions and trust they will enhance the learning experiences of others.

The work of this revision was capably facilitated by our Development Editor, Kelly Horvath. She worked tirelessly behind the scenes to make sure that a superb, state-of-the-art product was delivered on time! When emails are flying back and forth on Sundays and holidays, you know you have the best! Our very special thanks to our Senior Acquisitions Editor Jonathan Joyce, Senior Development Editor, Julie Vitale, and Editorial Coordinator Erin Hernandez for their hard work and guidance throughout the project. Thank you to Stephen Druding of the Design department, and Jennifer Clements, Art Director, who brought a fresh look to the entire Taylor Suite of products. The Instructional Services Consultants also deserve special thanks for their focus on our products to provide curriculum guidance, instructional design, technology support, and training. We also want to thank Andrea Mann, who worked creatively on many aspects of the teaching/learning package to ensure that faculty and students alike are getting the best resources to facilitate learning.

We thank all who generously gave their time, ideas, and resources, and we gratefully acknowledge the special contributions of the following:

- Rick Brady, Joe Mitchell, Ken Kasper, Barbara Proud, Gates Rhodes, and Kathy Sloane, photographers.
- Marie Clark, who developed the math problems and solutions in the "Medications" chapter.
- Kathleen Lucente, RN, MT, CIC, Infection Control Manager at Paoli Hospital, Paoli, Pennsylvania, for advising and updating us on changing infection-control protocols.

We gratefully acknowledge the influence of our mentors and teachers who have influenced our thoughts and writing; each person we have been privileged to care for as nurses; our students, who continually challenge us to find more effective means to teach nursing; our professional colleagues; and perhaps most important, our families and friends, whose love sustained us through the long hours of research and writing.

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UNIT II Health Care Delivery

UNIT III Processes of Thoughtful, Person-Centered Practice

Resources available on thePoint®

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UNIT IV: Developmentally Appropriate Care

UNIT V: Actions Basic to Nursing Care

UNIT VI: Promoting Healthy Physiologic Responses

UNIT VII: Promoting Healthy Psychosocial Responses

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Guidelines for Nursing Care

Fundamentals of Nursing

The Art and Science of Person-Centered Care

UNIT V

Actions Basic to Nursing Care

Unit V focuses on the actions basic to practice—the nursing interventions planned, implemented, and evaluated to meet the health care needs of diverse patients across the lifespan, at any point along the health–illness continuum, and in all settings. Nursing interventions discussed in this unit include reducing and preventing transmission of pathogens, assessing vital signs, conducting a health history and physical assessment, maintaining safety, integrating complementary health approaches and integrative health concepts, administering medications, and providing perioperative care.

Chapter 25 explains medical and surgical aseptic techniques necessary to prevent and control the spread of microorganisms. Chapter 26 describes assessing vital signs, and Chapter 27 discusses conducting a health history and physical assessment. Nursing assessment is both an art and a science. The art of performing a skill is integrated into the science of nursing so that variations from normal are identified and evaluated, and necessary nursing interventions are implemented. The findings from assessments provide a database necessary to maintain or restore health and promote wellness.

Nurses are responsible for meeting basic human needs for physical safety and security. Chapter 28 discusses promoting environmental safety (including threats from bioterrorism), identifying risk factors for patients at any age, and implementing teaching and other nursing actions to prevent accidents. Chapter 29 discusses complementary health approaches and integrative health concepts, an ever-increasing component of health care.

Chapters 30 and 31 focus on collaborative and independent nursing interventions used to accurately and safely administer medications and provide perioperative care. In most instances, the advanced-practice professional prescribes the medications, and the surgeon performs the surgery. The nurse implements nursing interventions to promote patient safety and knowledge, and to facilitate optimal function or recovery in both hospital and community settings. Although facility procedures and protocols are often used in these situations, nursing interventions are individualized to the unique needs of each person requiring care.

“Our intent when we lay hands on the patient in bodily care is to comfort.”

Lydia Hall (1906–1969), *an innovator in nursing practice, developed the theory that the direct nurse-to-patient relationship is itself therapeutic and that nursing care is the chief therapy for critically ill patients.*

25 Asepsis and Infection Control

Jackson Ray Ivers

Jackson Ray comes to visit his mother, who has been hospitalized for a new-onset fever and cough after exposure to a friend with a highly communicable respiratory virus. He notices a sign on the door to check at the nurse's desk before entering. He asks, "What's going on? Why do I have to wash my hands and wear a mask?"

Esther Bailey

Esther, a 72-year-old patient has developed a postoperative wound infection after abdominal surgery. She also demonstrates new-onset, postoperative urinary retention and an inability to void. The standard of care in this situation requires insertion of an indwelling urinary catheter.

Giselle Turheis

Giselle, a 38-year-old woman undergoing chemotherapy treatment for leukemia, states, "I know that my risk for infection is really high because of my poor immune status. But how do I respond to my Sunday school students, who are used to greeting me with a big hug? I want to be safe, but I know that I need these hugs too!"

Learning Outcomes

After completing the chapter, you will be able to accomplish the following:

1. Explain the infection cycle.
2. List the stages of an infection.
3. Identify patients at risk for developing an infection.
4. Describe nursing interventions used to break the chain of infection.
5. Identify situations in which hand hygiene is indicated.
6. Identify multidrug-resistant organisms that are prevalent in hospitalized patients and community settings.
7. List actual and potential problems and needs for a patient who has or is at risk for infection.
8. Describe strategies for implementing CDC guidelines for standard and transmission-based precautions when caring for patients.
9. Implement recommended techniques for medical and surgical asepsis.

Nursing Concepts

- Evidence-based practice
- Immunity
- Infection
- Inflammation
- Safety

A major concern for health care providers is the danger of spreading microorganisms from person to person and from place to place. Microorganisms are naturally present in almost all environments. Not all microorganisms are harmful—it depends on the type of organism, its location, the **host** (living being where an infectious, parasitic, or pathogenic agent resides and receives sustenance), and the circumstances. The Centers for Disease Prevention and Control (CDC, 2019g) defines **antimicrobials** as "drugs that treat infections by killing or slowing the growth of microbes causing infection.... bacterial infections are treated with drugs called antibiotics" (p. 7). Although *antimicrobial* and *antibiotic* are occasionally used interchangeably, antimicrobials technically include antifungals and drugs that treat parasites and viruses.

Government facilities at the international, national, state, and local levels, health care personnel, and laypeople recognize the need for an organized, systematic approach to the control of infections. For example, the CDC is the US government facility responsible for investigating, preventing, and controlling disease. Efforts by these facilities and people include mass immunization programs, laws concerning safe sewage disposal, regulations for the control of communicable diseases, and hospital infection–surveillance programs. Medical science continues to grapple with problems caused by increasingly virulent organisms that have become drug resistant, and problems related to patients who are vulnerable, including those who are immunologically compromised.

Prevention of infection is a major focus for nurses. The Quality and Safety Education for Nurses (QSEN Institute, 2020) initiative has identified safety as one of the leading issues in health care. The focus on safety includes effective infection control practices. As primary caregivers, nurses are involved in identifying, preventing, controlling, and teaching the patient about infection (see the accompanying Reflective Practice box on page 664). Applying infection prevention and control principles is the first critical step in breaking the cycle of infection.

INFECTION

Infection Cycle

An **infection** is a disease state that results from the presence of **pathogens** (disease-producing microorganisms) in or on the body. An infection occurs as a result of a cyclic process, consisting of six components, as shown in Figure 25-1 (on page 665). These components are:

- Infectious agent
- Reservoir
- Portal of exit
- Means of transmission
- Portals of entry
- Susceptible host

Infectious Agent

Some of the more prevalent agents that cause infection are bacteria, viruses, and fungi. **Bacteria**, the most significant and most commonly observed infection-causing agents in health care institutions, can be categorized in various ways. They are categorized by shape: spherical (cocci), rod shaped (bacilli), or corkscrew shaped (spirochetes). Bacteria can be categorized as either gram positive or gram negative based on their reaction to the Gram stain. For example, gram-positive bacteria have a thick cell wall that resists decolorization (loss of color) and are stained violet. However, gram-negative bacteria have chemically more complex cell walls and can be decolorized by alcohol. Thus, gram-negative bacteria do not stain. This information is crucial for providers when prescribing the most appropriate antibiotic therapy because antibiotics are classified as specifically effective against only gram-positive organisms or as broad spectrum and effective against several groups of microorganisms. Another distinguishing characteristic of (or way of categorizing) bacteria is their need for oxygen. Most bacteria require oxygen to live and grow and are, therefore, referred to as **aerobic**. Those that can live without oxygen are **anaerobic** bacteria.

A **virus** is the smallest of all microorganisms, visible only with an electron microscope. Viruses cause many infections, including the common cold, hepatitis A, B, and C (Centers for Disease Control and Prevention [CDC], 2020d), and human immunodeficiency virus (HIV). Antibiotics have no effect on viruses. However, there are some antiviral medications that decrease the severity and duration of viral

QSEN Reflective Practice: Cultivating QSEN Competencies

CHALLENGE TO ETHICAL AND LEGAL SKILLS

This is my last clinical rotation before graduation, and it has been a difficult year. My focus has been somewhat lacking for a while, and I haven't been as prepared as I should have been for my clinical and classroom experiences. My clinical instructor has been on my case for the last few weeks. I'm also realizing that in no time at all I will be out of school and providing patient care on my own. So, all of a sudden, I'm eager for as many clinical experiences as I can get. To make a long story short, I'm thrilled when offered the opportunity to catheterize Esther Bailey, a 72-year-old female patient on my unit. I quickly review the procedure and go to the patient's room, with the catheterization supplies in hand, feeling semi-confident. After introducing my clinical instructor and myself, and explaining what I'm about to do, I open the sterile package, prepare the sterile field, and cleanse the meatus. All of a sudden, as the patient asks a question and diverts my instructor's gaze, I realize (to my horror!) that I've contaminated the catheter. I've got a split second to decide what to do. I can tell my instructor what happened, obtain a new kit, and proceed anew, or pretend nothing happened and continue. After everything that has been drilled into us about the importance of sterility and the consequences of health care–associated infections (HAIs), I don't like that I'm even considering not admitting the mistake. But I'm also aware that it is time to leave the unit and the rest of the group is waiting for post-conference. Plus, after all, there are financial costs to obtaining another tray. But what if I do not admit the error and the instructor did see me contaminate the catheter? I run the risk of violating our university honor code!

Thinking Outside the Box: Possible Courses of Action

- Obviously the simplest solution: admit my error and accept the consequences.
- Request a new catheter and inform my instructor later that the patient moved just as I was preparing to enter the meatus (a bit of deception but this makes the error not MY fault).
- Alternatively, pretend that nothing happened and pray that no harm comes to the patient. (After all, how much bacteria do you need to contaminate a catheter? The patient is receiving antibiotic therapy postoperatively anyway.)
- Continue and not even be bothered by the contamination. (Life is one big risk for everyone, right? All that matters is that you take care of yourself first.)

Evaluating a Good Outcome: How Do I Define Success?

- Patient benefited from my actions or, at the very least, was not harmed.
- No one's integrity is compromised or sacrificed.
- No violations of the standards of practice or our nursing code of ethics (American Nurses Association [ANA], 2015) occurred.

Personal Learning: Here's to the Future!

At least I can say there was a happy ending to this story. I did stop, explain what happened, and waited while someone ran for a new catheterization tray. Amazingly, my instructor told me later that she valued my maturity, honesty, and ability to put the needs of the patient ahead of my own needs, stating that I "might just have what it takes after all!" I'm not sure how often I'll be called upon to put the needs of a patient ahead of my own needs, but hopefully I'll be ready to respond selflessly each time.

QSEN SELF-REFLECTION ON QUALITY AND SAFETY COMPETENCIES DEVELOPING KNOWLEDGE, SKILLS, AND ATTITUDES FOR CONTINUOUS IMPROVEMENT

How do you think you would respond in a similar situation? Why? Do you agree with the criteria that the nursing student used to evaluate a successful outcome? Why or why not? What *knowledge, skills,* and *attitudes* do you need to develop to continuously improve quality and safety when caring for patients like Mrs. Bailey?

Patient-Centered Care: What information regarding this procedure needs to be communicated to the patient? Does Mrs. Bailey understand why the urinary catheter is being inserted and the preferred target time for its removal?

Teamwork and Collaboration/Quality Improvement: What communication skills do you need to provide clear, comprehensive information to Mrs. Bailey? Did you explain to Mrs. Bailey why there was a pause in the procedure? Was your request for the additional supplies clearly and respectfully communicated to a team member? How was the charge/billing for the additional supplies handled?

Safety/Evidence-Based Practice: Is there anything you could have done to anticipate the unexpected? How do you think your response affected the situation? What evidence in nursing literature provides guidance for decision making regarding infection control?

Informatics: Can you identify the essential information that must be available in Mrs. Bailey's electronic record to support safe patient care? Is it important to electronically document daily the reasons why the urinary catheter is still in place?

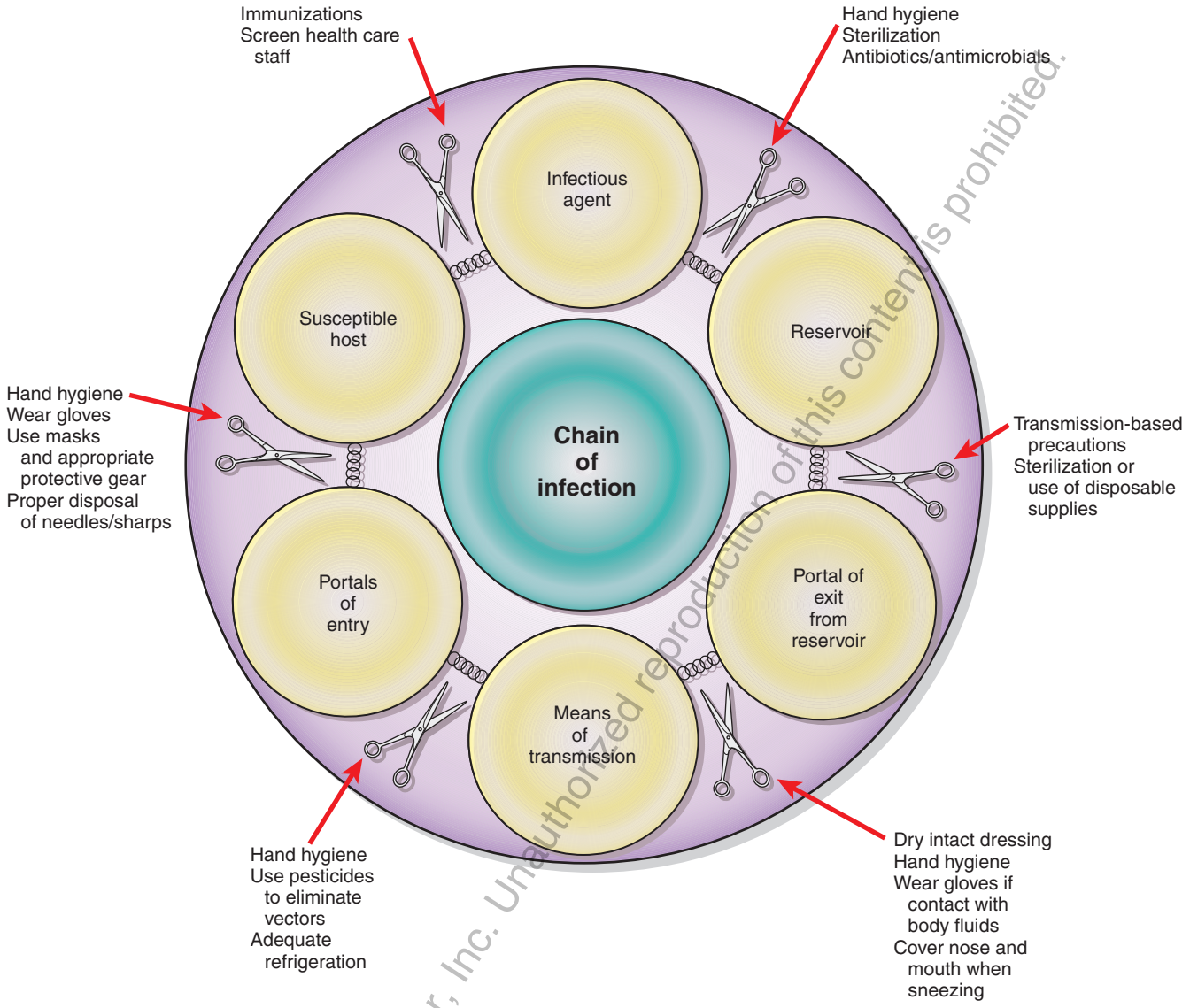


FIGURE 25-1. The infection cycle is demonstrated as a chain. The goal is to break the links of the chain to end the cycle. (*Source:* Adapted from Murphy, D. [1998]. Infectious microbes and disease: General principles. *Nursing Spectrum*, *7*[2], 12–14.)

infections such as influenza. The exact antiviral prescribed varies depending on the strain of influenza most prevalent in a given season and does not replace annual immunization (*flu shot*; CDC, 2019b). When given in the prodromal stage (infection/disease has begun, but the symptoms are just beginning and may be vague), antivirals can shorten the course of the illness with certain viruses such as herpes simplex virus type 1 (HSV-1; cold sores). With HIV specifically, antiretroviral therapy (ART) regimens are initiated as soon as possible after diagnosis because they effectively disturb the life cycle of the virus to block HIV replication and, ultimately, render the virus undetectable (Saag, 2019).

Fungi, plantlike organisms (molds and yeasts) that also can cause infection, are present in the air, soil, and water. Some examples of infections caused by fungi include athlete's foot, ringworm, and yeast infections. These infections are treated with antifungal medications; however, many infections due to fungi are resistant to treatment. **Parasites** are organisms that live on or in a host and rely on it for nourishment. Malaria is a serious disease that occurs when a parasite infects a certain type of mosquito that then feeds on humans.

Not all organisms to which a person is exposed cause disease. An organism's potential to produce disease in a person depends on a variety of factors, including:

- Number of organisms
- **Virulence** of the organism, or its ability to cause disease
- Competence of the person's immune system
- Length and intimacy (extent) of the contact between the person and the microorganism

IDENTIFICATION OF INFECTIOUS AGENTS

Identifying the type of infection and infectious agent is not always an easy process. Sometimes new diseases appear, and health care workers race to identify them so that treatment can begin. This is the process that occurred with AIDS and with severe acute respiratory syndrome (SARS). Other times, a disease that is **endemic** (occurs with predictability in one specific region or population) can appear in a different

Thoughtful Person-Centered Practice: Challenging Topics

Pandemic Considerations

Nursing is a profession. Among the hallmarks of professions are a certain degree of altruism and the quality of being self-regulating. When the coronavirus presented globally and in the United States in 2020, nurses were understandably on the frontlines of caring for the public. They cared for those who had contracted the virus, those at high risk of contracting the virus, and those who had exposure to persons with COVID-19. The ANA *Code of Ethics for Nurses* instructs nurses that our primary commitment is to patients, while at the same time telling us we have duties to self. Balancing these primary commitments during the pandemic became particularly stressful for many nurses and other health care professionals.

Reflection-in-Action

As you read, think about what the nurse needs to consider, both personally and professionally. What were the nurse's original thoughts? What factors were weighed in the decision making process? How did the nurse prioritize personal and professional responsibilities?

Scenario

Carol, a critical care nurse practitioner with three children, one of whom is a newborn, got a call to come back to work early. She had 3 weeks of maternity leave remaining, but a coworker was self-quarantining after feeling sick and getting tested, and the practice was short-staffed. Carol's husband was an emergency room physician already working extra shifts. If she went back to work, she had to think about how to stay safe (she knew about the shortage of personal protective equipment [PPE], N95 masks, gowns, etc.) and how to arrange care for her children. Her oldest was age 4 years. Her mother, age 65 years, was going to help, but this was now too risky given her mother's history of lung disease. Her mother's age and chronic condition put her in the highest-risk category.

Effective Noticing (Cues)

1. What did you notice about the situation initially? What information/observations are significant? What makes this situation different from a regular work assignment?

Effective Interpreting

2. How would you describe the obligations Carol has to "the patients who need her," her employer and team members, her family, herself, others?
3. If she cannot fulfill each of these obligations, how should she prioritize them? What basis/rationale would you use for prioritization?

Scenario

Remember that the ANA *Code of Ethics for Nurses* reminds us that "the nurse's primary commitment is to the patient," while at the same time states that "the nurse owes the same duties to self as to others, including the responsibility to promote health and safety, preserve wholeness of character and integrity, maintain competence, and continue personal and professional growth. In order to calculate her risk Carol needs to know more about the coronavirus and COVID-19. She also needs to know how to stay safe at work.

Effective Responding

4. Where is the best place to turn for guidelines? What resources should she tap?
5. If Carol believes that her hospital lacks the PPE to keep her safe, how should she respond? Does this lessen her obligation to work for this employer?

Scenario

Carol and her husband debated the pros and cons of her returning to work. After careful consideration, Carol, in partnership with her husband, made the anguished decision to return to work. "I know my patients need me." She would put whatever safeguards were needed to protect her family and loved ones, but she was called to care for her patients in this hugely uncertain time of need. In times of crisis, resource scarcity and the associated intentional allocation may become a serious consideration. The weight of a prolonged pandemic also affects individual and collective decision making and tolerance of risk.

Effective Reflecting

6. Do you agree with the choice the nurse made? Would you have made the same choice, why or why not? What would inform your decision?
7. How do you evaluate your professional and moral judgments?
8. Whether or not you decide to go back to work early, how might you use reflective practice to evaluate your decision so you can respond more confidently in the future? What criteria will you use to evaluate a good response? What personal characteristics inform your practice?
9. How would you respond to having to deny critical care to your oldest and sickest patients who would be least likely to benefit from scarce equipment and resources?
10. How do we handle exemptions to vaccine mandates? When do individual beliefs and practices take precedence over public health measures?

Reflection-on-Action

Then look back at the nurse's decisions and reflect on your learning—how did your knowledge and/or skills expand based on this scenario? What attitude, value, or belief shifts did you experience (if any) after reading this scenario? What would you do differently if you were in this situation? What more do you need to know to be able to manage this or a similar situation in the future?

Emmanuel, E. J., Persad, G., Upshur, R., Thome, B., Parker, M., Glickman, A., Zhang, C., Boyle, C., Smith, M., & Phillips, J. P. (2020). Fair allocation of scarce medical resources in the time of Covid-19. *The New England Journal of Medicine, 382*(21), 2049–2055.

Gostin, L. O., Friedman, E. A., & Wetter, S. A. (2020). Responding to COVID-19: How to navigate a public health emergency legally and ethically. *Hastings Center Report, 50*(2), 8–12.

Truog, R. D., Mitchell, C., & Daley, G. Q. (2020). The toughest triage—allocating ventilators in a pandemic. *The New England Journal of Medicine, 382*(21), 1973–1975.

For additional bioethics resources, we recommend this excellent, recent analysis of the ethical issues related to pandemics and have appended a short bibliography with hotlinks (https://www.thehastingscenter.org/responding-to-covid-19-how-to-navigate-a-public-health-emergency-legally-and-ethically/). Here is ethics guidance for health care institutions (https://www.thehastingscenter.org/ethicalframeworkcovid19/) and a resource hub on ethical issues in pandemics (https://www.thehastingscenter.org/publications-resources/ethics-resources-on-the-coronavirus/).

geographic location. For example, malaria that is endemic in Africa, particularly south of the Sahara and in parts of Oceania, is tracked to allow for ongoing assessment of the malaria situation around the world (CDC, 2020f). In cases like these, countries collaborate to learn about and implement diagnostic, control, and treatment options (World Health Organization [WHO], 2020b). **Pandemics**, like the one experienced with novel coronavirus (SARS-CoV-2) and the disease it causes (COVID-19) starting in 2019, are global outbreaks of a novel (new or not previously identified) virus that did not initially not have a known immunization or treatment (National Institute of Allergy and Infectious Disease, 2020). See the Challenging Topics feature.

COLONIZATION VERSUS INFECTION

Under normal conditions, some organisms may not produce disease. Microorganisms that commonly inhabit various body sites and are part of the body's natural defense system are referred to as normal flora. However, in certain situations, a typically harmless organism may generate an infection, especially in susceptible people. These bacteria are referred to as opportunists. For example, one type of *Escherichia coli* (*E. coli*) normally resides in the intestinal tract and causes no harm. However, if it migrates to the urinary tract, it can lead to urinary tract infection (UTI). Another example is the *Clostridioides difficile* organism (*C. diff*; formerly known as *Clostridium difficile*). If the *C. diff* organism resides in a person's body, but there are no clinical signs of an infection, this is referred to as *C. diff* **colonization**. An infection is present once the person exhibits specific manifestations of the disease. With both *E. coli* and *C. diff*, microscopic examinations reveal the presence of the bacteria. If a person's defense mechanisms are ineffective in responding to the bacterial invasion (colonization), infection will result.

Reservoir

The **reservoir** for growth and multiplication of microorganisms is the natural habitat of the organism. Possible reservoirs that support organisms pathogenic to humans include other people, animals, soil, food, water, milk, and inanimate objects.

OTHER PEOPLE

Some people who act as reservoirs for an infectious agent demonstrate signs and symptoms of the disease. Other people act as reservoirs for the infectious agent, but do not exhibit any manifestations of the disease. These people are considered carriers. Carriers, although asymptomatic, can transmit the disease. For example, a person who has tested positive for the HIV antibody/antigen may not exhibit any signs and symptoms of the disease at the time of testing. However, even the asymptomatic person may transmit the virus to others by activities such as condomless intimate sexual contact or sharing a contaminated needle and syringe. An infected pregnant woman may transmit the virus to her child during pregnancy, birth, or breastfeeding.

OTHER RESERVOIRS

Many other reservoirs exist and are encountered on a daily basis. The rabies virus is an example of a pathogen whose reservoir is various animals, notably dogs, squirrels, bats, and raccoons. A person contracts the rabies virus when bitten by an infected animal. The West Nile virus (WNV) is an example of an arbovirus (transmitted between arthropod [insect] vectors and a vertebrate host) whose reservoir is usually an infected mosquito or tick (McDonald et al., 2019). Mosquitoes feed on infected birds, become infected, and pass the infection on to people when feeding on their blood. The first local transmission of Zika virus infection was reported in December 2015 in the Caribbean. Zika is also transmitted by mosquitoes, which means that methods to prevent transmission of WNV (primarily prevention of mosquito bites) apply to Zika virus as well. Sexual and maternal–fetal transmission of Zika virus have been documented; poor pregnancy outcomes and microcephaly (a brain defect) can occur (CDC, 2020e), so preconception counseling is recommended (Polen et al., 2018).

Water can harbor *Giardia, E. coli* 0157-H7, and *Shigella.* Drinking or swimming in contaminated water can begin the infectious cycle in a person. Soil can act as a reservoir for the organisms that cause gas gangrene and tetanus. Food can also be a reservoir. Undercooked ground beef and fresh leafy vegetables have been identified as responsible for recent outbreaks of *E. coli* infections. The CDC recommends that all ground beef be cooked until well done and new laws keep fruits and vegetables safer when they are grown, picked, and washed. Milk can contain *Listeria* unless it is pasteurized. Reporting infectious disease outbreaks, including domestic foodborne illnesses with their associated recalls (e.g., lettuce and poultry) and current diseases international travelers may encounter, remains the responsibility of the CDC (2020i). Inanimate objects can also harbor organisms, such as the influenza virus, which may be spread if a person touches a contaminated article and then touches their nose or eyes. Nurses need to pay special attention to transferring organisms. For example, a nurse with artificial nails may harbor a large number and variety of microbes under the nails. Ineffective handwashing or improper glove use may also result in exposing an immunocompromised patient to the risk of infection.

Portal of Exit

The portal of exit is the point of escape for the organism from the reservoir. The organism cannot exert its influence unless it moves away from its original reservoir. Each type of microorganism has a typical primary exit route. In humans, common portals of exit include the respiratory, gastrointestinal (GI), and genitourinary (GU) tracts as well as breaks in the skin. Blood and tissue can also be portals of exit for pathogens.

Means of Transmission

An organism may be transmitted from its reservoir by various means or routes. Some organisms can be transmitted by more than one route. Organisms can enter the body by way of contact transmission, either directly or indirectly. **Direct contact** requires close proximity between the susceptible host and an infected person or a carrier, and includes activities such as touching, kissing, and sexual intercourse. Health care workers have the potential to directly transmit

organisms to susceptible people through touching. **Indirect contact** involves personal contact with either: (1) a **vector**, a living creature that transmits an infectious agent to a human, usually an insect; or (2) an inanimate object, called a **fomite**, such as equipment or countertops (Brunette & Nemhauser, 2019). Keep in mind that nurses use stethoscopes many times of the course of day—stethoscopes, especially when unclean, have the potential to act as fomites of infection. In addition to providing education and addressing misconceptions and negative attitudes, best-practice recommendations, infection control policies and procedures, and functional systems need to be in place to support stethoscope hygiene practices (Breen & Hessels, 2017). Proper hand hygiene and glove use can interrupt the transmission of dangerous bacteria from nurses to patients. Ongoing work is being done to evaluate the effectiveness of antimicrobial surfaces, such as copper, in preventing and reducing health care–associated infections (HAIs; Muller et al., 2016; Zingg et al., 2019).

Recall ***Esther Bailey***, the woman described at the beginning of the chapter in the Reflective Practice box on page 664, who was catheterized. In this situation, the catheter becomes contaminated. Indirect contact occurs if this contaminated catheter is inserted, predisposing her to an infection.

Microorganisms can also be spread through the airborne route when an infected host coughs, sneezes, or talks, or when the organism becomes attached to dust particles. Another means of transmission is through droplets. **Droplet transmission** is similar to **airborne transmission**. However, airborne particles are smaller than 5 µm (micrometer), and droplet particles are greater than 5 µm. This distinction matters when designing prevention strategies. For example, once there were data to support droplet transmission of the virus that causes COVID-19 (WHO, 2020d), frequent handwashing, disinfection of high-touch areas, social distancing (6 ft), and cloth masks for the general public became the cornerstones of transmission prevention (CDC, 2020g). These prevention recommendations continued even after vaccines became available because of the virus variants. Recommendations from WHO (2020) and other national and international guidelines specified that health care environments need to consider airborne transmission precautions with COVID-19, in addition to contact and droplet precautions (PPE required), with aerosol-generating procedures. Table 25-1 summarizes the means of transmission for several organisms, their reservoirs, and examples of diseases they transmit.

Portal of Entry

The portal of entry is the point at which organisms enter a new host. The organism must find a portal of entry to a host or it may die. The entry route into the new host is often the same as the exit route from the prior reservoir. The skin and urinary, respiratory, and GI tracts are common portals of entry.

Concept Mastery Alert

The skin and respiratory, gastrointestinal, and genitourinary tracts are common portals for organism entry and exit.

Table 25-1 Organisms Capable of Causing Disease

ORGANISM	RESERVOIR	MEANS OF TRANSMISSION	DISEASE TRANSMITTED
Borrelia burgdorferi	Ticks (sheep, cattle, deer, mice)	Contact (indirect, vectors)	Lyme disease
Escherichia coli (E. coli)	Feces Contaminated food or water	Contact (direct/indirect)	*E. coli* infection (Most common manifestation is diarrhea)
Hepatitis B virus (HBV)	Blood Feces Body fluids and excretions	Contact (direct; indirect possible, but unlikely)	Hepatitis B
Human immunodeficiency virus (HIV)	Blood Semen Vaginal secretions Breast milk	Contact (direct)	Acquired immunodeficiency syndrome (AIDS)
Mycobacterium tuberculosis (*M. tuberculosis* [TB])	Sputum (respiratory tract)	Contact (airborne)	Tuberculosis
Salmonella	Intestinal tracts of humans and other animals, including birds	Contact (direct/indirect)	Diarrheal illness
Staphylococcus aureus	Skin surface Mouth Nose Throat	Contact (direct/indirect)	• Minor skin infections: Carbuncle, boil, pimple, abscess • Respiratory infection • Endocarditis (infection of the heart valves) • Osteomyelitis (bone infection) • Bacteremia (bloodstream infections)

Susceptible Host

Microorganisms survive only in a source that provides shelter and nourishment (a host), and only if the microorganisms overcome any resistance mounted by the host's defenses. Susceptibility is the degree of resistance the potential host has to the pathogen. People who are hospitalized are often in a weakened state of health because of illness, and have less resistance. Thus, they are more susceptible to infection. Many factors influence a host's susceptibility; these are discussed later in the chapter.

Remember **Giselle Turheis**, the woman with leukemia and a compromised immune status. Her susceptibility to infection is increased because of the lack of an adequate functioning immune system.

Stages of Infection

An understanding of the stages in the development of an infection is necessary to intervene and disrupt the infection cycle. An infection progresses through the following phases:

- Incubation period
- Prodromal stage
- Full (acute) stage of illness
- Convalescent period

The course and severity of the infection, as well as the patient's response, influence the type and extent of nursing care provided.

Incubation Period

The incubation period is the interval between the pathogen's invasion of the body and the appearance of symptoms of infection. During this stage, the organisms are growing and multiplying. The length of incubation may vary. For example, the common cold has an incubation period of 1 to 2 days, whereas tetanus has an incubation period ranging from 2 to 21 days.

Prodromal Stage

A person is most infectious during the prodromal stage. Early signs and symptoms of disease are present, but these are often vague and nonspecific, ranging from fatigue and malaise to a low-grade fever. This period lasts from several hours to several days. During this phase, the patient often is unaware of being contagious. As a result, precautions are not taken, and the infection spreads to other hosts.

Full Stage of Illness

The presence of infection-specific signs and symptoms indicates the full stage of illness. The type of infection determines the length of the illness and the severity of the manifestations. Symptoms that are limited or occur in only one body area are referred to as *localized* symptoms, whereas symptoms manifested throughout the entire body are referred to as *systemic* symptoms.

Convalescent Period

The convalescent period involves the recovery from the infection. Convalescence may vary according to the severity of the infection and the patient's general condition. The signs and symptoms disappear, and the person returns to a healthy state. Depending on the type of infection, there may be a temporary or permanent change in the patient's previous health state even after the convalescent period.

A person may continually pass through the four phases with the same infectious process, such as with HSV-1. Although there may have been only one infectious exposure, the infection may continue to cycle through the phases.

Infection Defense Mechanisms

Several defense mechanisms protect the body from invasion. The skin and mucous membranes are considered first-line defenses. One of the other first-line defenders is the body's normal flora, particularly the flora found in the GI tract. Flora help to keep potentially harmful bacteria from invading the body. If a pathogen makes it past these first-line defenses, the inflammatory response and immune response help the body combat infection.

Inflammatory Response

The inflammatory response is a protective mechanism. Inflammation helps the body neutralize, control, or eliminate the offending agent, and prepare the site for repair (Hinkle et al., 2022). In addition to infection, the inflammatory response also occurs in response to injury. It is either an acute or chronic process.

The hallmark signs of acute infection are redness, heat, swelling, pain, and loss of function, usually appearing at the site of the injury/invasion. The body's response occurs in two phases that are responsible for these hallmark signs: the vascular and cellular phases. In the vascular phase, small blood vessels constrict in the area, followed by vasodilatation of arterioles and venules that supply the area. This increase in blood flow results in redness and heat in the area. Histamine is released, leading to an increased permeability of vessels, which allows protein-rich fluid to pour into the area. At this point, swelling, pain, and loss of function can occur (Norris, 2019).

During the cellular stage, white blood cells (leukocytes) move quickly into the area. Neutrophils, the primary phagocytes, engulf the organism and consume cell debris and foreign material. Exudate, composed of fluid, cells, and inflammatory byproducts is released from the wound. The exudate may be clear (serous), contain red blood cells (sanguineous), or contain pus (purulent). The amount of exudate depends on the size and location of the wound. The damaged cells then are repaired by either regeneration (replacement with identical cells) or the formation of scar tissue (Norris, 2019). Refer to Chapters 33 and 43 for additional discussion of the inflammatory response.

Immune Response

Another protective mechanism is the immune response. The normal immune response involves the collective reaction of

the immune system to an invading organism. The complex mechanisms that constitute the immune response occur as the body attempts to protect and defend itself. The foreign material is called an **antigen**, and the body commonly responds to the antigen by producing an **antibody**. This antigen–antibody reaction, also known as humoral immunity, is one component of the overall immune response. The other component that also helps the body defend against invaders is cell-mediated immunity. This type of immunity involves an increase in the number of lymphocytes (white blood cells) that destroy or react with cells the body recognizes as harmful (Norris, 2019). Although these complicated chemical and mechanical responses are not completely understood, it is known that they help to defend the body specifically against bacterial, viral, and fungal infections as well as malignant (cancerous) cells.

Factors Affecting the Risk for Infection

The susceptibility of the host depends on various factors:

- Integrity of skin and mucous membranes, which protect the body against microbial invasion
- pH levels of the GI and GU tracts, as well as the skin, which help to ward off microbial invasion
- Integrity and number of the body's white blood cells, which provide resistance to certain pathogens
- Age, sex, and heredity, which influence susceptibility—neonates and older adults appear to be more vulnerable to infection (see the accompanying box: Focus on the Older Adult)
- Immunity, natural or acquired, which acts to resist infection
- Level of fatigue, nutritional and general health status, the presence of preexisting illnesses, previous or current treatments, and certain medications, which play a part in the susceptibility of a potential host
- Stress level, which if increased may adversely affect the body's normal defense mechanisms
- Use of invasive or indwelling medical devices, which provides exposure to and entry for more potential sources of disease-producing organisms, particularly in a patient whose defenses are already weakened by disease

Health habits that promote wellness can reduce potential risk factors, thus decreasing the susceptibility of a host. Sensible nutrition, adequate rest and exercise, stress-reduction techniques, and good personal hygiene habits can help maintain optimum bodily function and immune response. Condomless anal or vaginal sex, sex between an

Focus on the Older Adult

AGE-RELATED CHANGES PREDISPOSING TO INFECTION

Infection Risk	Age-Related Changes	Nursing Strategies
Pulmonary infections	• Decreased cough reflex • Decreased elastic recoil of lungs • Decreased activity of cilia • Abnormal swallowing reflexes	• Place patient in sitting position to eat and drink. • Encourage patient to drink plenty of fluids, unless contraindicated. • Encourage patient to cough and deep breathe or use incentive spirometer. • Recommend pneumococcal vaccination (per guidelines) and influenza vaccination annually.
Urinary tract infections (UTI)	• Incomplete emptying of bladder • Decreased sphincter control • Bladder-outlet obstruction due to enlarged prostate gland • Pelvic floor relaxation due to estrogen depletion • Reduced renal blood flow	• Discuss with patient need to void at regular intervals. • Encourage patient to drink plenty of fluids, unless contraindicated. • Administer medications for enlarged prostate (benign prostate hypertrophy; BPH) and estrogen depletion as prescribed. • If patient wears absorbent product such as incontinence pad, instruct patient to change pad frequently and perform good perineal care. • Assess for UTIs (may be atypical clinical presentation in older adults). • Discuss the need for patient to void after sexual intercourse.
Skin infections	• Loss of elasticity • Increased dryness • Thinning of epidermis • Slowing of cell replacement • Decreased vascular supply	• Encourage patient to drink plenty of fluids, unless contraindicated. • Help patient to perform good hygiene practices daily. • Apply lotion to skin as needed. • Assess frequently for any breaks in skin integrity, rashes, or changes in skin.

Note: Atypical clinical manifestations of infection in an older adult include confusion, disorientation, lethargy, anorexia, delayed fever response, falls, incontinence, and failure to thrive.

Box 25-1 Laboratory Data Indicating an Infection

- Elevated white blood cell (leukocyte) count—normal value is 5,000 to 10,000/mm^3
- Increase in specific types of white blood cells—referred to as a differential or differential count (percentage of each cell type)
  - Neutrophils — Normal = 60%–70% — Increased in acute infections that produce pus; increased risk for acute bacterial infection if decreased; may also be increased in response to stress
  - Lymphocytes — Normal = 20%–40% — Increased in chronic bacterial and viral infections
  - Monocytes — Normal = 2%–8% — Increased in severe infections: function as a scavenger or phagocyte
  - Eosinophils — Normal = 1%–4% — May be increased in allergic reaction and parasitic infection
  - Basophils — Normal = 0.5%–1% — Usually unaffected by infections
- Elevated erythrocyte sedimentation rate—red blood cells settle more rapidly to the bottom of a tube of whole blood when inflammation is present
- Presence of pathogen(s) in cultures of urine, blood, sputum, or other (wound) drainage

HIV-uninfected person and a person living with HIV with an unsuppressed viral load (Marcus & Snowden, 2020), and sharing intravenous (IV) needles are potentially dangerous, providing an opportunity for pathogens to enter a host and cause an infection.

Think back to ***Esther Bailey***, the woman being catheterized who also has developed a postoperative wound infection. Undergoing abdominal surgery disrupts the integrity of the skin and mucous membranes, thereby increasing her risk for a wound infection.

NURSING PROCESS FOR INFECTION PREVENTION AND CONTROL

It is imperative that health care providers safeguard the people entrusted to their care by controlling diseases and preventing the spread of infection. Vigilant preventive care can limit exposure to potentially harmful infectious organisms and reduce the occurrence of infection. Public health nurses and other professionals often initiate follow-up including **contact tracing**, which involves identifying people with an infectious disease and locating individuals and groups with whom they have come into direct contact to interrupt actual or potential transmission of the infectious disease (CDC, 2020j).

Assessing

The nurse plays a critical role in preventing and controlling infection. This role begins with early detection and surveillance techniques. The extent of nursing interventions depends on the susceptibility of the host, the virulence of the organism, and the patient's signs and symptoms.

Inquire about the patient's immunization status and previous or recurring infections. Observe nonverbal cues and gather information about the history of the current disease. Nursing assessments include observing for signs and symptoms of a local or systemic infection. A localized infection can result in redness, swelling, warmth in the involved area, pain or tenderness, and loss of function of the affected part. Manifestations of a systemic infection include fever, often accompanied by an increase in pulse and respiratory rate, lethargy, tenderness and enlargement of lymph nodes, and anorexia. Laboratory data can provide further insight into the presence of an infectious process. Any of the laboratory test results outlined in Box 25-1 may indicate the presence of an infection.

Compilation of these assessment data leads to the development of a unique nursing database that outlines potential nursing interventions for patients at risk for infection or those in whom an infection is already present.

Diagnosing

The potential for infection or the presence of an infection in a patient may lead to diagnosing actual or potential health problems or needs. These identified problems and needs guide the development and communication of a coordinated plan that often involves the interprofessional team. Examples of health problems and needs with related etiology and signs and symptoms can be found in the box titled Examples of Actual or Potential Health Problems or Needs: Asepsis and Infection Control on page 672.

Outcome Identification and Planning

The nurse develops appropriate patient outcomes after reviewing the assessment data, considering the cycle of events resulting in an infection, and incorporating the principles of infection control. Planning outcomes that prevent infection or disrupt the infection cycle presents an exciting challenge. Nursing interventions focused on controlling or preventing infection can positively impact patient outcomes. The following examples of expected patient outcomes are appropriate for preventing infection and using infection control techniques. The patient will:

- Demonstrate effective hand hygiene and good personal hygiene practices
- Identify the signs of an infection
- Maintain adequate nutritional and fluid intake
- Demonstrate proper disposal of soiled articles
- Use appropriate cleansing and disinfecting techniques

Examples of Actual or Potential Health Problems or Needs

ASEPSIS AND INFECTION CONTROL

Actual or Potential Health Problem or Need	Possible Etiologic Factors	Potential Signs and Symptoms
Dehydration	• Insufficient fluid intake • Insufficient knowledge about fluid needs • Fluid loss secondary to underlying infection	• Decrease in blood pressure, pulse pressure, and pulse volume • Dry mucous membranes • Increase in body temperature • Sudden weight loss • Weakness and other neurologic symptoms
Infection risk	• Alteration in skin integrity • Inadequate vaccination • Insufficient knowledge to avoid exposure to pathogens	—
Knowledge deficiency	• New and evolving standards of care and infection control practices	• Inability to articulate current infection control standards • Unwillingness to adhere to guidance regarding infection control

Source: Wolters Kluwer. (2020). Problem-based care plans. In *Lippincott advisor*. Wolters Kluwer. https://advisor.lww.com/lna/home.do

- Verbalize awareness of the necessity of proper immunizations
- Implement stress-reduction techniques
- Adhere to infection control precautions (isolation, equipment, visitors)
- Verbalize an understanding of health risks associated with a latex allergy

Implementing

The practice of **asepsis** includes all activities to prevent infection or break the chain of infection. The nurse uses aseptic techniques to halt the spread of microorganisms and minimize the threat of infection. There are two asepsis categories: medical asepsis and surgical asepsis. **Medical asepsis**, or clean technique, involves procedures and practices that reduce the number and transfer of pathogens. Medical asepsis procedures include performing hand hygiene and wearing gloves. **Surgical asepsis**, or sterile technique, includes practices used to render and keep objects and areas free from microorganisms. Surgical asepsis procedures include inserting an indwelling urinary catheter or inserting an IV catheter.

Using Medical Asepsis

Medical asepsis techniques are used continuously both within and outside health facilities, based on the assumption that pathogens are likely to be present. For example, shared drinking cups are considered unsanitary because a person harboring pathogens may transfer those pathogens to the cup. In a health care facility, if a specific pathogen is known to be present, special methods of medical asepsis are used to prevent further spread of the organism. Nearly every nursing activity includes practices of medical asepsis. Therefore, the nurse assumes responsibility for breaking the cycle of infection by providing safe patient care that protects the patient and the nurse from microorganisms that may cause disease. Box 25-2 highlights the basic practices of medical asepsis for nurses to routinely use when providing care to patients.

Limiting the dissemination of pathogens will decrease the transfer of pathogens from person to person. The most practical way to accomplish this is through the use of barriers that prevent transmission of the pathogens. Barriers are ways to decrease the spread of pathogens and include hand hygiene, personal protective equipment (PPE, discussed later), and other barrier techniques. Figure 25-2 shows how barriers break the infection cycle. Nurses must understand the various precautions or barrier techniques if they are to use them correctly and minimize infection risks to patients as well as to themselves (see Promoting Health 25-1 on page 674).

PERFORMING HAND HYGIENE

Hand hygiene is the most effective way to help prevent the spread of infectious agents. There is consensus that most health care–associated pathogens are transmitted via the contaminated hands of health care workers. According to an ongoing survey supported by the CDC, there were an estimated 1 in 31 hospitalized patients with an HAI, which has decreased since the original survey in 2011 (Magill et al., 2018). The CDC's initial guidelines for hand hygiene in health care settings remain largely unchanged (Healthcare Infection Control Practices Advisory Committee, 2017). The term *hand hygiene* applies to either handwashing with plain soap and water, the use of antiseptic handrubs including waterless alcohol-based products, or surgical hand antisepsis. Although there is agreement that hand hygiene is the most important procedure for preventing infections, hand hygiene is still not performed consistently in health care

Box 25-2 Practicing Basic Principles of Medical Asepsis in Patient Care

- Practice good hand hygiene.
- Carry soiled linens or other used articles/equipment so that they do not touch your clothing.
- Do not place soiled bed linen or any other items on the floor, which is grossly contaminated. It increases contamination of both surfaces.
- Avoid allowing patients to cough, sneeze, or breathe directly on others. Provide them with disposable tissues, and instruct them to cover their mouth and nose to prevent spread by airborne droplets.
- Move equipment away from you when brushing, dusting, or scrubbing articles. This helps prevent contaminated particles from settling on the hair, face, and clothing.
- Avoid raising dust. Use a specially treated cloth or a dampened cloth. Do not shake linens. Dust and lint particles constitute a vehicle by which organisms may be transported from one area to another.
- Clean the least soiled areas first and then the more soiled ones. This helps prevent having the cleaner areas soiled by the dirtier areas.
- Dispose of soiled or used items directly into appropriate containers. Wrap items that are moist from body discharge or drainage in waterproof containers, such as plastic bags, before discarding into the refuse holder so that handlers will not come in contact with them.
- Pour liquids that are to be discarded, such as bath water or mouth rinse, directly into the drain to avoid splattering in the sink and onto you.
- Sterilize equipment suspected of containing pathogens.
- Use practices of personal grooming that help prevent spreading microorganisms. Examples include shampooing the hair regularly, keeping hair short or pinned up to limit the possibility of carrying microorganisms on hair shafts, keeping fingernails short and free of broken cuticles and jagged nail edges, and avoiding wearing rings with grooves and stones that may harbor microorganisms.
- Follow guidelines conscientiously for standard and transmission-based precautions as prescribed by your facility.

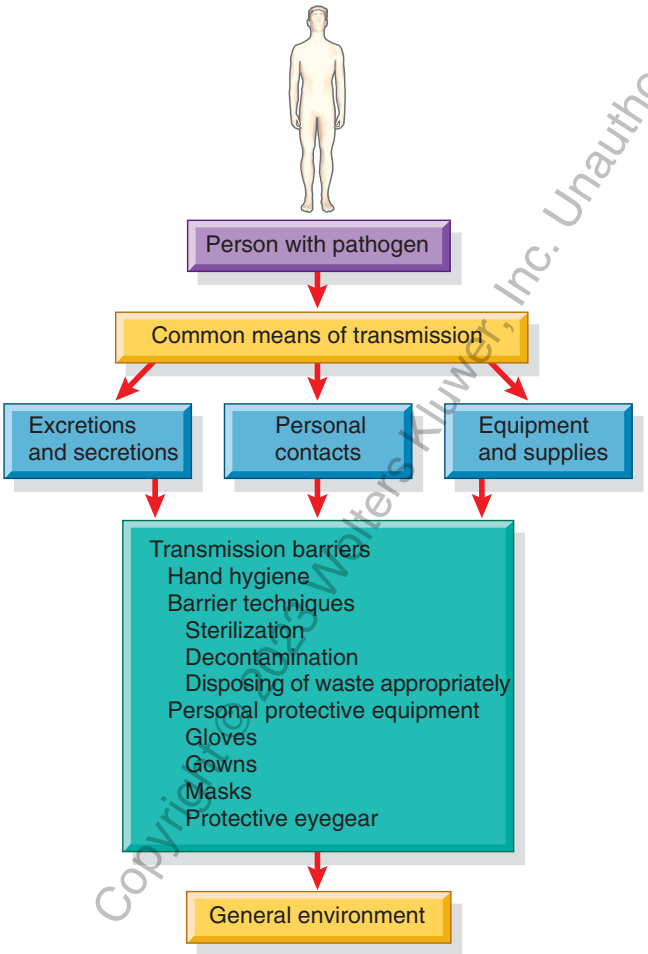


FIGURE 25-2. Transmission barriers help prevent the transporting of pathogens from the infected person to the general environment.

settings. A recent review of the literature found that the average baseline compliance rate for handwashing (based on the results from 16 studies performed primarily in the United States and Europe 2009–2014) was only 34.1%. The average compliance rate for handwashing increased to 56.98% after the implementation of various multimodal, multifaceted educational, and motivational interventions (Kingston et al., 2016). Other initiatives to support the evidence-based practice of handwashing highlight the benefits of positive role models (including leaders and managers), establishing a socially and culturally supportive clinical environment, the provision of ongoing education and training, and readily available supplies (Hammerschmidt & Manser, 2019; Kingston et al., 2017). Review the Research in Nursing box (on page 674) for another perspective on improving hand hygiene.

The WHO (2020c) defined *My 5 Moments for Hand Hygiene*. These include:

- Moment 1—Before touching a patient
- Moment 2—Before a clean or aseptic procedure
- Moment 3—After a body fluid exposure or risk of exposure
- Moment 4—After touching a patient
- Moment 5—After touching patient surroundings

The Joint Commission Center for Transforming Healthcare continues its campaign inviting all Joint Commission–accredited organizations to improve patient safety and lower the cost of health care. The Hand Hygiene Project takes advantage of their Targeted Solutions Tool (TST) that facilitates a "step-by-step process to accurately measure their organization's actual performance, identify their barriers to excellent performance, and direct them to proven solutions that are customized to address their particular barriers" (The Joint Commission Center for Transforming Healthcare, 2020, p. 1).

Promoting Health 25-1

INFECTION CONTROL PRECAUTIONS AND BARRIER TECHNIQUES

Use the assessment checklist to determine how well you are observing infection control or barrier precautions as you care for patients in a health care facility or in a community setting. Then develop a prescription for self-care by choosing appropriate behaviors from the list of suggestions.

Assessment Checklist

☐ almost always ☐ sometimes ☐ almost never

☐ ☐ ☐ 1. I perform hand hygiene before and after contact with a patient.

☐ ☐ ☐ 2. I choose the evidence-based option for hand hygiene depending on the situation (e.g., alcohol-based, pain soap and water, antimicrobial/antiseptic soap and water).

☐ ☐ ☐ 3. I wear PPE if contact with blood or body fluids is a possibility.

☐ ☐ ☐ 4. I cover my nose and mouth when coughing and sneezing and properly dispose of tissues.

☐ ☐ ☐ 5. I use additional protective equipment (gowns, masks, goggles, face shields) as appropriate.

☐ ☐ ☐ 6. I avoid recapping any used or contaminated needles.

☐ ☐ ☐ 7. I place needles or other sharp objects in a puncture-proof disposable container.

☐ ☐ ☐ 8. I dispose of used or contaminated objects and equipment in a leak-resistant plastic trash bag.

☐ ☐ ☐ 9. I am a role model for hand hygiene.

☐ ☐ ☐ 10. I collaborate with leadership to hold people accountable, identify access points for hand hygiene, and establish places to store items to accommodate hand hygiene.

Self-Care Behaviors

1. Read infection control standards published by OSHA and CDC.
2. Attend programs that provide updates on current CDC/OSHA policies and survey literature regularly to determine best practices.
3. Maintain strict personal hygiene habits.
4. Obtain immunizations when available.
5. Assess for any signs and symptoms of an infection.
6. Perform hand hygiene frequently.
7. Perform hand hygiene immediately after removing gloves.
8. Practice cough etiquette to prevent transmission of respiratory infections.
9. Protect myself with the barriers necessary to prevent exposure to blood, body fluids, or secretions.
10. Follow facility policy if any exposure to blood or body substance occurs.
11. Never eat, drink, smoke, apply cosmetics or lip moistener, or handle contact lenses in an area where occupational exposure is possible.
12. Make hand hygiene a habit.

Research in Nursing

BRIDGING THE GAP TO EVIDENCE-BASED PRACTICE

Hand Hygiene Compliance in the ICU: A Systematic Review

Despite the fact that hand hygiene is recognized as a key element in preventing the spread of infection, there are still significant issues with compliance in health care, even in ICUs where patients are already compromised. Hand hygiene noncompliance persists despite global efforts to impact change.

Related Research

Lambe, K. A., Lydon, S., Madden, C., Vellinga, A., Hehir, A., Walsh, M., & O'Connor, P. (2019). Hand hygiene compliance in the ICU: A systematic review. *Critical Care Medicine*, *47*(9), 1251–1257. https://doi.org/10.1097/CCM.0000000000003868

A systematic review considered 61 peer-reviewed studies focused on hand hygiene compliance, primarily in high-income countries (60.7%) and in adult intensive care units (ICUs; 85.2%). Overall, mean hand hygiene compliance internationally is 59.6%, which falls below the accepted standard that ranges from 80% to 90%. Of note is that compliance was higher in neonatal ICUs (67.0%) than in pediatric (41.2%) or adult ICUs (58.2%). Compliance varies by type of health care worker, with nurses at 43.4% compliance, physicians at 32.6% compliance, and other staff (e.g., respiratory therapists, custodial staff, and technicians) at 53.8% compliance with hand hygiene. Interestingly enough, compliance rates were similar whether data were collected covertly (participants did not know they were being observed) or overtly (participants were aware they were being observed).

Relevance to Nursing Practice

This systematic review highlights the need to continue targeted educational, environmental, and compliance initiatives focused on hand hygiene. Although the WHO standards have been in circulation internationally since 2009, health care compliance varies by geographic location, unit type, and composition of providers.

Table 25-2 Bacterial Flora on the Hands

TYPES OF BACTERIAL FLORA	CHARACTERISTICS	EFFECTIVE HAND HYGIENE MEASURES
Transient	• Occur on hands with activities of daily living • Relatively few in number on clean and exposed areas of the skin • Attached loosely on skin usually in grease, fats, and dirt • Found in greatest number under the fingernails • Can be pathogenic or nonpathogenic	Can be removed relatively easily by frequent and thorough handwashing
Resident	• Normally found in skin creases • Usually stable in number and type • Cling tenaciously to skin by adhesion and absorption	Considerable friction with a brush is required to remove them Less susceptible to antiseptics than transient bacteria

The targeted solutions tool and associated increase in hand hygiene has resulted in a 45% reduction in HAIs (up from 26% reduction) and saved up to 2.8 million dollars in direct medical costs (The Joint Commission Center for Transforming Healthcare, 2020).

The CDC Foundation forged an ongoing relationship with GOJO, the inventors of PURELL Instant Hand Sanitizer, to enhance hand hygiene educational outreach to patients, health care providers, and caregivers in various health care settings in the United States. The tools and educational materials are designed to improve hand hygiene practices and ultimately reduce the number of HAIs in the United States (CDC Foundation, 2016; GOJO Industries, 2020).

Bacteria

Two types of bacterial flora are normally found on the hands: transient bacteria and resident bacteria (Table 25-2). Transient bacteria, although usually easily removed by thorough handwashing, have the potential to adjust to the environment of the skin when they are present in large numbers over a long period of time, and become resident bacteria. If pathogenic organisms become resident bacteria on the skin, the hands then become carriers of that particular organism. Therefore, to help prevent transient bacteria from becoming resident bacteria, it is important to clean the hands promptly when they are visibly soiled, after each contact with contaminated materials, and after removing gloves. In addition, the seminal CDC guideline for hand hygiene in health care settings (2002) specifies that health care personnel involved in patient care should not wear artificial nails because they are more likely to be associated with higher bacterial counts. In fact, wearing artificial nails in the operating room (OR) is a citable offense during The Joint Commission accreditation process. Natural nails should be less than 1/4 inches long.

Cleansing Agents

Various hand hygiene products are available. Soaps and detergents, also referred to as nonantimicrobial agents, are considered adequate for routine mechanical cleansing of the hands and removal of most transient microorganisms. They work by lowering surface tension and acting as emulsifying agents. Bar, liquid, leaflet, and powdered soaps are all effective. Use of a particular product in a health care facility often depends on personnel or facility preference.

Using handwashing products that contain an antimicrobial or antibacterial ingredient is recommended in any setting where the risk for infection is high. When present in certain concentrations, these agents can kill bacteria or suppress their growth. Numerous studies that informed the landmark 2006 Institute for Healthcare Improvement (IHI, 2020b) guidance documented that alcohol-based handrubs, in most situations, more effectively reduce bacterial and viral counts on the hands of health care personnel than antimicrobial soap (IHI, 2020b). Alcohol-based handrubs have an alcohol concentration between 60% and 95% and are available as foam, gel, or lotions.

Techniques

If the health care worker's hands are not visibly soiled, alcohol-based handrubs are recommended because they save time, are more accessible and easy to use, and reduce bacterial count on the hands. The following are clinical situations when an alcohol-based handrub can be used to decontaminate hands (IHI, 2020b.)

- Before direct contact with patients
- After direct contact with patient's skin
- After contact with body fluids, mucous membranes, nonintact skin, and wound dressings, if hands are not visibly soiled
- After removing gloves
- Before inserting urinary catheters, peripheral vascular catheters, or invasive devices that do not require surgical placement
- Before donning sterile gloves prior to an invasive procedure (e.g., inserting a central venous access device)
- When moving from a contaminated body site to a clean body site during patient care
- After contact with objects (including equipment) located in the patient's environment

When used repeatedly, alcohol-based handrubs cause less dryness and skin irritation than soap products. Those who have sensitive or dry skin may benefit from use of an alcohol-based product that contains humectants, such as glycerine,

Guidelines for Nursing Care 25-1

HAND HYGIENE: USING AN ALCOHOL-BASED HANDRUB

- Apply product to the palm of one hand, using the amount of product recommended on the package (it will vary according to the manufacturer but usually is 3 mL and may require dispensing two pumps).
- Rub hands together, making sure to cover all surfaces of the hands, fingers, and in between the fingers. Also, clean the fingertips and the area beneath the fingernails.
- Continue rubbing until the hands are completely dry (at least 20 seconds).

or other emollients or moisturizers (Berardi et al., 2020; Gold & Avva, 2020). See Guidelines for Nursing Care 25-1 for directions on how to use an alcohol-based handrub.

Concept Mastery Alert

Alcohol-based handrubs are a quick way to remove germs when hands are not visibly soiled.

Alcohol-based hand sanitizers are effective against gram-positive and gram-negative bacteria including multidrug-resistant pathogens such as methicillin-resistant *Staphylococcus aureus* (MRSA) or vancomycin-resistant enterococci (VRE), HIV, influenza, HBV, and hepatitis C virus (HCV). They are also highly effective in halting the spread of seasonal flu, rhinovirus (the most common cause of colds), and many emerging viral pathogens such as Ebola virus disease (EVD), Zika virus, and severe acute respiratory syndrome coronavirus (SARS-CoV-2). The use of alcohol-based handrubs are less effective with *Cryptosporidium* (a waterborne parasite), norovirus (related to contaminated food), and *C. diff*, so soap and water are recommended. For example, *C. diff* is a gram-positive, anaerobic, spore-forming bacterium that is a common cause of diarrhea. It affects children, adults, and older adults. The morbidity and mortality associated with *C. diff* infections (CDIs) has motivated health care providers to improve prevention strategies. Alcohol does not kill *C. diff* bacterial spores; it only kills the vegetative form of the cell. One theory posits that when exposed to water, the endospore swells and the protective walls of the endospore burst (Yoo, 2018), but other theories posit the soap and rubbing associated with handwashing cause spore death. Either way, in the absence of definitive research, soap and water are the preferred hand hygiene method when these infections are suspected or diagnosed (Berardi et al., 2020; Gold & Avva, 2020). Glove use remains the cornerstone for preventing transmission, and contact precautions including a private/cohorted room and gown use are recommended until diarrhea stops. CDI is discussed later in this chapter.

If a health care worker's hands are visibly soiled or contaminated with blood or body fluids, washing the hands with antimicrobial soap and water is required. Handwashing is also required before eating and after using the restroom. Effective handwashing requires at least a 20-second scrub with plain soap or disinfectant and warm water. Hands that are visibly soiled need a longer scrub. Recommended handwashing techniques for medical asepsis are listed in Skill 25-1 on pages 692–694.

Hand antisepsis before assisting with a surgical procedure involves a lengthier scrub to reduce resident and transient flora on the forearms and hands. This procedure, known as a surgical hand scrub, incorporates surgical asepsis and is described in texts that deal with operating and delivery room procedures. Since 2002, CDC guidelines recommend using an antimicrobial soap or alcohol-based surgical hand scrub product for surgical hand antisepsis. Scrub time is also reduced significantly when alcohol-based scrub agents are used.

Preventing Health Care–Associated Infections

For various reasons and sometimes despite best efforts, certain patients in health care facilities develop **health care–associated infections (HAIs)**. The term HAI encompasses and has replaced the term nosocomial, which was used specifically to indicate something originating or taking place in a hospital. Infections that are community acquired and not associated with health care are differentiated from HAIs. An HAI develops as a result of medical care and may occur in many health care settings including hospitals, rehabilitation facilities, outpatient settings, and dialysis centers. The source of an HAI may be either exogenous or endogenous. An infection is referred to as **exogenous** when the causative organism is acquired from other people. An **endogenous** infection occurs when the causative organism comes from microbial life harbored in the person. An infection is referred to as **iatrogenic** when it results from a treatment or diagnostic procedure.

Prevention of HAIs is a major challenge for health care providers. Although this number has been on the decline since 2014, HAIs account for tens of thousands of deaths and billions of dollars in additional health care costs annually (Agency for Healthcare Research and Quality [AHRQ], 2019). The cost of the additional hospital care days necessary to treat an HAI is staggering, particularly in light of the efforts to control spiraling health care expenses. With its focus on patient safety, The Joint Commission mandated that death or serious injury caused by an infection-related event must be reported as a sentinel event (see Chapter 28 for a discussion of sentinel events; The Joint Commission, 2020). As of 2013, the Centers for Medicare and Medicaid Services (CMS) no longer reimburses hospitals for specific

preventable *hospital-acquired conditions* (HACs). These HACs are high cost and/or high-volume occurrences that could be reasonably prevented with adherence to evidence-based guidelines; when they occur, HACs result in higher costs. Specific HAIs (catheter-associated UTIs, vascular catheter–associated infections, and various surgical site infections [SSIs]) are included in CMS's current 14 categories of HACs (CMS, 2020). As part of the Hospital-Acquired Condition Reduction Program (HACRP), CMS payments for 2019–2020 were reduced 1% for hospitals ranked in the 25% of worst-performing hospitals with respect to risk-adjusted HAC quality measures. Although this is an evolving process, there is potential that the critical impact that nurses have on decreasing the number of HAIs will be recognized and more easily verified.

Healthy People 2030 (2021) identifies opportunities for addressing existing infection control policies and practices in outpatient settings. These settings include ambulatory surgical centers, dialysis centers, traditional outpatient offices and clinics, and long-term care facilities. Expanding prevention efforts across the continuum of care is essential to the prevention of HAIs.

Based on the premise that most HAIs are preventable, in 2008 the U.S. Department of Health and Human Services (USDHHS; 2021), in conjunction with multiple other federal facilities, formed a Federal Steering Committee committed to coordinating strategies to reduce the transmission of HAIs. The most recent HAI action plan for 2015–2020 recently completed, with seven targets tracked. These include:

- Catheter-associated urinary tract infection (CAUTI)
- Surgical site infection (SSI)
- Central line–associated bloodstream infection (CLABSI)
- Invasive health care–associated and hospital-onset methicillin-resistant *Staphylococcus aureus* (MRSA) infections
- *Clostridioides difficile* (*C. diff*) infections (CDIs) and CDI hospitalizations

USING INVASIVE MEDICAL DEVICES

Most HAIs are caused by bacteria, such as *C. diff*, *E. coli, S. aureus, Streptococcus faecalis, Pseudomonas aeruginosa,* and *Klebsiella* species. Many HAIs can be traced to an invasive device, such as a urinary catheter or venous access catheter. For example, UTIs represent more than 9.5% of the infections reported by hospitals, and virtually all health care–associated UTIs are related to procedures and instrumentation involving the urinary tract. Approximately 12% to 16% of hospitalized adults have an indwelling urinary catheter placed; each patient has a 3% to 7% increased risk of acquiring a CAUTI each day the catheter remains in place (CDC, 2020b). Infection control measures include adherence to recommended best practices, or bundles. **Bundles** are typically three to five evidence-based practices that, when implemented together, improve patient outcomes (IHI, 2020a). The American Nurses Association (ANA, n.d.) initiative to prevent CAUTI outlines three areas of focus: (1) prevention of inappropriate short-term urinary catheter use, (2) timely removal of catheters that is nurse driven, and (3) catheter care during placement. Focused initiatives, like the one from the ANA, have resulted in changes in practice; however, surveillance, reporting, and prevention initiatives are still mandated and important. CLABSIs have a high mortality rate and are very costly. Central line insertion and maintenance guidelines, like those from the CDC and The Joint Commission (2013), clearly outline handwashing and aseptic technique when handling central lines. The 5-year target goal for CLABSI is a 50% reduction in the number of cases; recent figures show a 9% reduction between 2017 and 2018, with an 11% decrease reported in intensive care units (ICUs; CDC, 2019c).

Consider ***Esther Bailey***, the 72-year-old woman who has had abdominal surgery and developed a wound infection. The patient already has one infection. However, insertion of the catheter increases her risk for an additional infection, directly related to the use of the catheter.

The USDHHS Federal Steering Committee's (2020) target of 30% reduction in surgical site infections is on track, with a 17% decrease seen in targeted SSIs between 2008 and 2014 (CDC, 2016). Patients receiving mechanical ventilation are especially at risk for ventilator-associated pneumonia (VAP). This infection occurs when pathogens gain access to a patient's lungs via either an endotracheal or tracheostomy tube. VAP bundles provide an excellent example of how simultaneous implementation of seemingly simple interventions such as elevating the head of the bed to 30 to 45 degrees, providing regular oral care, and changing the ventilator circuit (tubing) only as needed, can be effective in preventing infection (Hinkle et al., 2022; Klompas, 2014). With all invasive devices, whether a venous access device, urinary catheter, or endotracheal tube, the interprofessional team collaborates to determine and document the necessity of a device, adheres to standards of care for insertion, and implements protocols (including bundles and guidelines) that address evidence-based infection prevention interventions.

REPORTING HEALTH CARE–ASSOCIATED INFECTIONS

Mandatory public reporting of HAI rates is required in the majority of states (CDC, 2019f). These reports contain specific data on CLABSI, CAUTI, SSI, MRSA, and *C. diff*, with additional information provided on antibiotic resistance and emerging infections. Check this link to see if your state is required by law to report HAI data: https://www.cdc.gov/HAI/state-based/required-to-report-hai-NHSN.html (see Additional Resources). Advocates of mandatory reporting believe that all facilities should report HAI rates. This public disclosure allows consumers to make more informed choices regarding their selection of a health care facility based on an institution's efforts to prevent HAIs. The expectation is that electronic medical records will serve as a surveillance system for tracking these events, thus streamlining the processes

and providing an infrastructure for tracking. Keep in mind that several factors influence the speed with which initiatives like this one are embraced (AHRQ, 2014):

- Environmental factors: Who does this change benefit? Is the change mandatory?
- The nature of the innovation: Is it easy to understand? Is there strong evidence to support the change?
- Whether or not people can make the change: Can one person make a difference? Can we individualize the decision making?
- Organizational factors: Are there competing priorities, resource issues, and/or multiple decision makers?

DEALING WITH MULTIDRUG-RESISTANT ORGANISMS

A significant and disturbing trend continues to be the development of microorganisms, primarily bacteria (but also parasites, viruses, and fungi), resistant to one or more classes of antibiotics (or antimicrobials) that were originally effective to treat these infections (WHO, 2020a). The indiscriminate use of broad-spectrum antibiotics has allowed once-susceptible bacteria to develop defenses against antibiotics. While antibiotics kill bacteria that cause illness, they also affect good bacteria that protect the body from infection. As a result, the drug-resistant bacteria continue to grow and can even share their drug resistance with other bacteria, which further complicates treatment (CDC, 2019g). Resistant organisms MRSA, VRE, and carbapenem-resistant Enterobacteriaceae (CRE) have emerged. The CDC (2019g) lists four core actions to fight resistant strains:

- Preventing infections, thereby preventing the spread of resistance
- Tracking
- Improving antibiotic prescribing/stewardship
- Developing new drugs and diagnostic tests

Although this chapter will review some of the more urgent threats and most commonly known resistant infections, data and the associated prevention and treatment guidelines are always evolving. A good resource is the CDC's 2019 *Antibiotic Resistance Threats in the United States* that can be found at: https://www.cdc.gov/drugresistance/pdf/threats-report/2019-ar-threats-report-508.pdf; the 2013 version is also available on the site for comparison data.

Methicillin-Resistant *Staphylococcus aureus*

S. aureus bacteria are normally found in the nasal mucous membranes, on the skin, and in the respiratory and GI tracts. Approximately one third of the people in the United States are colonized with *S. aureus*, meaning that the organism is present (typically in the nose), but the person does not have symptoms and remains healthy and uninfected. They can, however, pass the organism on to others (CDC, 2019a). In the 1960s, a strain of *S. aureus* emerged that was resistant to the broad-spectrum antibiotic methicillin, which is the drug of choice used to treat these infections. The very powerful antibiotic, vancomycin, had to be used to treat the MRSA infections that, at that time, primarily occurred in health care settings. In the late 1990s, a type of MRSA appeared in the wider community. The prevalence of community-associated MRSA (CA-MRSA), a common cause of skin and soft tissue infections in the United States, has been increasing rapidly. Those most at risk are young children, older adults, and people in close physical proximity to others, including athletes, military personnel, inmates, and daycare attendees (CDC, 2019c; Gupta et al., 2015).

Treatment options for CA-MRSA begin with the use of good handwashing, PPE, and disinfection/sterilization of equipment by health care providers who come into contact with CA-MRSA. Guidelines currently recommend incision and drainage of abscesses in patients who are afebrile and healthy with mild, uncomplicated abscesses. Antimicrobial therapy may not be required. If incision and drainage are not effective and systemic or serious infection results, antimicrobial therapy may be necessary. Prior to antibiotic therapy, wound drainage should be sent for culture and sensitivity testing. Patient follow-up education includes encouraging frequent handwashing and maintenance of good personal hygiene, reviewing wound care techniques and the necessity of completion of prescribed treatment, and developing a prevention plan based on the identification of potential sources of infection (Gupta et al., 2015).

The health care–associated MRSA strain, on the other hand, has more serious implications. Patients who have surgery, have invasive devices, are immunocompromised, or who have longer hospital stays are at risk for developing an MRSA infection (Wang et al., 2015). MRSA can be responsible for bloodstream infections, wound infections, VAP, and multidrug resistance. IV vancomycin remains one of the first-line medications for the treatment of health care–associated MRSA (Cong et al., 2019; Pryor et al., 2020). In a health care setting, the main mode of transmission is through direct contact with the contaminated hands of health care personnel or indirect contact with equipment (CDC, 2019a). National data indicate that there was a 17% decrease in hospital-onset MRSA bloodstream infection rate each year between 2005 and 2013, but no significant changes occurred between 2013 and 2016. There were an estimated 323,700 cases in 2017, with 10,600 deaths (CDC, 2019g). Basic infection control practices remain the key to the prevention and control of MRSA.

Vancomycin Intermediate-Resistant *Staphylococcus aureus*, Vancomycin-Resistant *Staphylococcus aureus*, and Vancomycin-Resistant Enterococci

In the 1990s, following the increased use of vancomycin to treat MRSA, vancomycin intermediate-resistant *Staphylococcus aureus* (VISA) emerged in the United States, followed in 2002 by VRSA that was totally resistant to vancomycin (Pryor et al., 2020). Once bacteria develop drug resistance, they progress from being sensitive to an antibiotic, to an intermediate resistance, followed by complete resistance to the antibiotic. Since October 2010, all cases of VISA and VRSA have been successfully treated with other drugs approved by the U.S. Food and Drug Administration, and cases remain extremely rare. Patients most at risk of developing VISA and VRSA are

those with a history of kidney disease or diabetes, a previous MRSA infection, presence of an invasive catheter, or recent exposure to vancomycin. Effective infection control measures are imperative to control the spread of VISA and VRSA; prudent use of vancomycin is an important preventive measure (Virginia Department of Health, 2018).

VRE are another serious pathogen in hospitals. Enterococci, a species of *Streptococcus* found in normal GI and GU tracts, can cause HAIs with a high mortality rate if the organism is vancomycin resistant. As the enterococci mutate and develop acquired and intrinsic resistance to mainstay drugs such as vancomycin, ampicillin, and gentamycin, providers continue to give targeted therapy (such as the synthetic antibiotic linezolid or daptomycin) in an effort to treat the infection and reduce complications (Levitus et al., 2020; see Table 25-1 on page 668). Risk factors for VRE are similar to other HAIs and include compromised immune systems, recent surgery, invasive devices, prolonged antibiotic use (especially vancomycin), and prolonged hospitalization.

VRE is spread via contact with the feces, urine, or blood of an infected or colonized person. In 2017, there were an estimated 54,500 cases of VRE in hospitalized patients, with 5,400 estimated deaths (CDC, 2019g). Health care providers must work to ensure prompt recognition, diagnosis, isolation, management, and infection control. Nursing assessment, intervention, and evaluation of high-risk patients and situations help to minimize infection and reduce the unnecessary suffering imposed on patients. To control the transmission of both MRSA and VRE, the CDC and a large volume of published evidence continue to support contact precautions along with meticulous hand hygiene, reducing the use of invasive devices, environmental cleaning, and decolonizing high-risk patients. Some institutions have removed contact precautions from this bundle and instead include standard precautions; they have noted no significant change in the incidence of MRSA or VRE (Pryor et al., 2020).

Carbapenem-Resistant Enterobacteriaceae

CRE are very difficult to treat and represent a public health threat. This disease was first reported in 2001 in the United States and is associated with a 40% to 50% mortality rate. *Klebsiella* species and *E. coli* are examples of Enterobacteriaceae normally found in the human intestine. Carbapenem antimicrobial drugs are broad-spectrum antimicrobials and the agents of choice for serious infections when an organism is resistant to other primary antibiotics. Resistance to carbapenems leaves few other treatment options. These organisms are readily passed from patient to patient, but rarely impact healthy people. People who have bladder or venous catheters in place, those who require ventilator assistance to breathe, patients with open surgical wounds, those taking antibiotics for a lengthy period of time, or people who have frequent hospitalizations (especially in an ICU) or long-term care facility stays are at risk for developing CRE. The plan of care requires laboratory testing to detect resistance to carbapenems; decisions on treatment of infections with CRE are based on these results. In 2017, there were an estimated 13,100 cases of CRE in hospitalized patients, with 1,100 deaths (CDC, 2019g). The CDC (2019g) recommends that the patient be placed on contact precautions. A focus on hand hygiene and education regarding prevention of CRE transmission are vital to prevent transmission of the deadly infection.

Acinetobacter Baumannii

Carbapenem-resistant *Acinetobacter baumannii* (CRAB) is a gram-negative bacterium found primarily in hospitals; those with immune issues, chronic lung disease, or diabetes may be more susceptible. It has spread through health care facilities, infecting 8,500 people that resulted in 700 deaths in 2017 (CDC, 2019g). CRAB has developed resistance to many antibiotic regimens, severely limiting treatment options and resulting in myriad clinical trials and observational studies to investigate alternative approaches to treat CRAB (Piperaki et al., 2019). When patients transition from one level of care to another, acute care, long-term care, and rehabilitation health care workers must maintain high-quality contact precautions to minimize the transfer of CRE (including CRAB) to another facility (Pryor et al., 2020). Because *A. baumannii* can also sustain itself in the environment, the patient's room and all mechanical equipment must be cleaned and disinfected to eliminate fomite transmission.

Clostridioides Difficile

Although not an antibiotic resistant infection, *C. diff* is caused by similar factors and is directly related to antibiotic use and resistance. National data indicate almost 223,900 people in the United States required hospitalization for *C. diff*, with at least 12,800 deaths attributed to *C. diff* (CDC, 2019g). While health care–associated (hospital and long-term care facilities) cases of CDIs are decreasing, community-associated cases of CDI are not. Although adults and children are both affected, CDI is seen largely in older adults. Both symptomatic and asymptomatic people serve as reservoirs for *C. diff*, as do any surfaces or objects contaminated with feces. This organism normally resides in the intestinal tract. When antibiotics (particularly broad-spectrum antibiotics) are prescribed or taken for a prolonged period of time, helpful bacteria are destroyed, and *C. diff* bacteria can grow out of control, creating a bacterial imbalance. Watery diarrhea, fever, and mild abdominal cramping are some of the more common signs and symptoms, but the severity of CDI depends on the specific strain (CDC, 2019e; Dubberke et al., 2014). Prevention is the key. General strategies to reduce the indirect transmission of CDI include (CDC, 2019e; Dubberke et al., 2014):

- Confirming CDI in patients with appropriate diagnostic testing protocols
- Avoiding the use of electronic equipment that is difficult to clean (electronic thermometers)
- Disinfecting dedicated patient care items and equipment (stethoscopes) between patients
- Using terminal cleaning protocols (including *C. diff* sporicidal agents) for patient-care areas and equipment with patient transfers and discharge

- Using full-barrier contact precautions (gown and gloves)
- Placing patients in private rooms; cohort patients with the same strain of CDI
- Performing meticulous hand hygiene (discussed earlier in this chapter on pages 672–675)
- Performing environmental contamination of rooms
- Educating health care providers (and patients/families as appropriate) on clinical presentation, transmission, and epidemiology of CDI
- Facilitating antibiotic stewardship (prescribing only when needed; minimizing high-risk antibiotic use)

QSEN *CLOSTRIDIOIDES DIFFICILE (C. DIFF)* INFECTION

Remember that CDI is not killed by alcohol-based handrubs, so soap and water are required.

In addition to recognition of CDI and prevention of transmission, keep in mind that best practice involves the measured use of antimicrobials—prescribing them at an appropriate dose and only when indicated. Antibody-based therapies may be used to manage patients with recurrent *C. diff* infections (CDC, 2019g).

STERILIZING AND DISINFECTING

Cleansing, disinfection, and sterilization help break the cycle of infection and prevent disease. Several processes are used to destroy microorganisms. **Disinfection** destroys all pathogenic organisms except spores; **sterilization** destroys all microorganisms, including spores/endospores (Yoo, 2018). Disinfection can be used when preparing the skin for a procedure or cleaning a piece of equipment that does not enter a sterile body part. Sterilization is usually performed on equipment that is entering a sterile portion of the body. Disinfection and sterilization of contaminated or infected objects and good hand hygiene diminish and often eliminate microorganisms as potential sources of infection.

Method Selection

Various factors influence the choice of sterilization and disinfection methods, including the following:

- Nature of organisms present: The CDC recommends that all supplies, linens, and equipment in a health care setting should be treated as if the patient were infectious. Some organisms are easily destroyed, whereas others can withstand certain common sterilization and disinfection methods.
- Number of organisms present: The more organisms present on an item, the longer it takes to destroy them.
- Type of equipment: Equipment with small lumens, crevices, or joints requires special care. Certain articles that may be damaged by various sterilization and disinfection methods require special handling.
- Intended use of equipment: The need for medical or surgical asepsis influences the preparation and cleaning of equipment. In the home, it may be safe to use equipment and supplies that are clean, but most health care facilities use sterilized articles for patient care.
- Available means for sterilization and disinfection: The choice of chemical or physical means of sterilization and disinfection depends on the nature and number of organisms, the type and intended use of the equipment, and the availability and practicality of the means. Table 25-3 lists the types of methods for sterilization and disinfection.
- Time: Time is a key factor when sterilizing or disinfecting articles. Failure to follow the recommended time periods is grossly negligent.

USING PERSONAL PROTECTIVE EQUIPMENT AND SUPPLIES

According to the 1992 Occupational Safety and Health Administration (OSHA) ruling, health care facilities must provide employees with the equipment and supplies necessary to minimize or prevent exposure to infectious material. This **personal protective equipment (PPE)** includes gloves, gowns, masks, and protective eye gear. Skill 25-2 on pages 695–700 illustrates the proper use of this equipment.

Gloves

Gloves are not a substitute for good hand hygiene. They are worn only once and discarded appropriately according to facility policy. Then hands are thoroughly decontaminated with meticulous hand hygiene. When nursing care activities do not involve the possibility of soiling the hands with body fluids, gloves are not necessary. Activities such as turning a patient, feeding a patient, taking vital signs, and changing IV fluid bags do not require the use of gloves as long as the potential contact with body fluids is not present. However, when there is a possibility of soiling the hands with body fluids, gloves must be worn.

Each patient interaction requires a clean pair of gloves. Some care activities for an individual patient may necessitate changing gloves more than once. Gloves should always be changed prior to moving from a contaminated task to a clean one. While wearing gloves, never leave the patient's room (unless transporting a contaminated item or moving a patient requiring transmission-based precautions), never write in the patient's chart, and never use the computer keyboard or telephone in the nurses' station. Also, health care workers should not touch their pagers, cell phones, or other facility-based communication devices without first performing good hand hygiene. Mobile phones, which are ubiquitous, fit easily into lab coat or scrub pockets where dirty hands can come into contact with the device. The dark, warm pockets are a breeding ground for thousands of microbes. Several studies confirm that touch screens and phones have microbe growth in 82% to 88% of the mobile phones tested. The good news is that hand hygiene is an effective means to stop the cycle of contamination (Cobb & Lazer, 2020).

Wearing gloves does not eliminate the need for proper hand hygiene. In reality, the warmth and moisture inside gloves create an ideal environment for bacteria to multiply, making it even more important to perform good hand hygiene before and after using gloves. Evidence-based practice

Table 25-3 Methods of Sterilization and Disinfection

METHOD	DISCUSSION	CAUTION
Physical		
Steam	Higher temperature caused by higher pressure destroys organisms (e.g., autoclaving)	Most plastic and rubber devices are damaged by autoclaving
Boiling water	Frequently used in the home—simple and inexpensive; boil item for at least 10 minutes	Spores and some viruses are not destroyed by boiling
Dry heat	Alternative sterilization method for home Used for metal items Heat oven to 350°F for 2 or more hours	Insufficient to destroy all microorganisms; not used in health care facilities
Radiation	Used for pharmaceuticals, foods, plastics, and other heat-sensitive items	Object must be directly exposed to ultraviolet radiation on all surfaces Poses risk to personnel
Chemical		
Ethylene oxide gas	Destroys microorganisms and spores/endospores by interfering with metabolic processes in cells Gas is released while items (oxygen and suction gauges, blood pressure equipment) are contained in autoclave	Precautions necessary because gas is toxic to humans
Chemical solutions	Generally used for instrument and equipment disinfection and for housekeeping disinfection Chlorines are useful for disinfecting water and for housekeeping purposes A solution of sodium hypochlorite (household bleach) in a 1:100 dilution effectively inactivates human immunodeficiency virus. Betadine and alcohol are also used as disinfectants	Method does not destroy all spores and may cause corrosion on metal surfaces

supports that gloving does not guarantee complete protection from infectious organisms. Gloves provide a barrier but are not impenetrable. It has been shown that many times glove-barrier failure goes undetected by the health care worker. Double gloving (putting on two gloves on one hand) is recommended if the health care worker is involved in a procedure during which exposure to blood or body fluids is expected, such as in an operating room (OR) setting where evidence indicates that glove perforations were reduced by 71% with double gloving (Association of periOperative Registered Nurses, 2020).

Sensitization to latex varies among health care workers based on their role and actual exposure to latex. Approximately 10% of health care workers and 1% to 2% of the general population are sensitized to traditional latex (Burkhart et al., 2015; Occupational Safety and Health Administration [OSHA], n.d.). Reactions to latex fall into three categories: (1) irritant contact dermatitis that results from contact with gloves where the hands become irritated and dry—this is not actually not an allergy; (2) allergic contact dermatitis (a type IV sensitivity), which is an actual reaction to the latex that results in localized pruritus (itching), erythema (redness or rash), and urticarial lesions 24 to 96 hours after the contact; and (3) a true latex allergy (a type I hypersensitivity) where there is an immediate systemic response that may result in anaphylaxis (Burkhart et al., 2015; National Institute for Occupational Safety and Health [NIOSH], 2012a). The cornstarch powder or talc used to make gloves easier to put on is a causative factor in latex allergy development, which is why there has been a move to powder-free gloves in the clinical setting. The powder binds with the latex protein and becomes airborne, thus contaminating the environment (Henry et al., 2020). Powder particles may be inhaled or absorbed into skin or mucous membranes or enter the bloodstream. It is important to remember that repeated exposures to latex have been shown to lead to a latex sensitivity. If a person continues to be exposed to latex after a sensitivity has developed, that person may demonstrate signs of a latex allergy. At present, there is no cure for a latex allergy.

The NIOSH (2012a) recommends that nonlatex gloves or powder-free, low-allergen latex gloves (if latex gloves are used) be available for use. Also, according to the OSHA Personal Protective Equipment Standard 1910.132 (2016), employers must provide alternative gloves if necessary. Because a completely *latex-free* environment is considered unattainable given the ubiquitous nature of latex, a *latex-safe* health care environment is essential for patients and health care providers with a latex allergy. All health care facilities are required to have a written policy that identifies how to deal with latex-sensitive employees and patients. Awareness of an allergy to latex is also important for safe home care. See Box 25-3 (on page 682) for information on latex allergy for health care personnel and patients.

Gowns

Gowns are usually worn to prevent soiling of the health care worker's clothing by the patient's blood and body fluids. They

Box 25-3 Latex Allergy Summary

Risk Factors

- Occupational exposure to latex (includes health care professionals)
- People with allergic tendencies
- People with food allergies, specifically banana, papaya, avocado, potatoes, kiwi fruit, chestnuts, and pineapples
- People with asthma, spina bifida, or a history of multiple surgical procedures or exposures to latex

Frequently Used Products that Contain Latex

- Gloves
- Blood pressure cuffs
- Electrode pads
- Stethoscopes
- IV tubing
- Urinary catheters
- Tourniquets
- Syringes
- Surgical masks
- Baby bottle nipples and pacifiers

Types of Reactions

- *Irritant contact dermatitis:* most common reaction usually restricted to hands that have come into contact with latex; symptoms include dry, irritated skin associated with pruritus
- *Allergic contact dermatitis or delayed hypersensitivity:* allergic contact dermatitis, displayed as dry, crusty bumps, erythema, pruritus, scaling vesicles, papular lesions at site of contact, including the palms; symptoms usually appear in 24 to 96 hours
- *Latex allergy or immediate hypersensitivity:* systemic reactions usually happen within minutes of exposure; displayed as rhinitis, conjunctivitis, angioedema, bronchospasm, shock, and/or systemic anaphylactic reactions; this is a life-threatening sensitivity that is rarely the first reaction to latex exposure

Diagnosis

- RAST (radioallergosorbent test): blood test for IgE antibodies to latex
- Skin prick: small amount of serum derived from latex placed on small prick in skin

Treatment

- Prevention: avoidance of latex-containing products
- Localized reaction: treat with oral diphenhydramine, cool compresses, and hydrocortisone 1% cream
- Systemic reaction: possibly treated with epinephrine subcutaneously, systemic steroids, antihistamines, with transport to the emergency department
  - Remove all latex-containing articles from the room
  - Place three-way stopcocks in IV lines for medication administration; place tape over any injection ports on IV tubing

Patient Teaching (If Diagnosed With Latex Allergy)

- Avoid all latex-containing products and avoid inhaling powder used in latex gloves
- Inform employer and other health professionals of latex allergy
- Wear medical alert bracelet
- Follow doctor's recommendations
- Inform health care provider/nurse of allergy prior to any injections/immunizations; a latex-free vial stopper should be used
- Ensure that health care provider is aware of allergy prior to any medical procedure or surgery

Source: Adapted from National Institute for Occupational Safety and Health (NIOSH). (2012a). *NIOSH Fast Facts–Home healthcare workers: How to prevent latex allergy*. DHHS (NIOSH) Publication No. 2012–119. http://www.cdc.gov/niosh/docs/2012-119/pdfs/2012-119.pdf

provide barrier protection and are donned immediately before entering the patient's room. Individual gown technique is recommended. This technique involves wearing a gown only one time and then discarding it appropriately according to facility policy. A waterproof or impervious gown is used if there is an increased likelihood of contact with a patient's blood or body fluids. If a gown becomes heavily soiled or moistened with blood or body fluids when caring for a patient, remove it, perform thorough hand hygiene, and put on a clean gown. There is no single special technique for applying a gown used as a barrier, but recommended practices for removing a soiled gown are described in Skill 25-2 on pages 695–700.

Masks

Surgical masks, which are FDA approved, and procedure/isolation masks help prevent biologic particles from being disseminated into the air by the wearer. Masks help prevent the wearer from coming into direct contact with known or suspected infected body fluids (such as blood) that may spray or splash. When worn properly, masks also protect the wearer from exposure to large particle pathogens (>5 µm in size) spread through close respiratory or mucous membrane contact with respiratory droplets. These droplets are generated by coughing, sneezing, or talking, and they typically travel less than 3 ft but may reach 6 ft in certain instances. (See Transmission-Based Precautions later in this chapter.) Particulate respirators are used to prevent the inhalation of either airborne droplet nuclei or small particle aerosols (≤5 µm in size), which can remain suspended in the air and travel longer distances (see Transmission-Based Precautions later in this chapter; Siegel et al., 2019).

Various mask practices are used. In some instances, all personnel and all the patient's visitors wear masks while in the patient's room. In other situations, the patient wears the mask when transported outside their room to either protect health care personnel and other patients from exposure to pathogens, or to protect the patient.

In the clinical setting, a mask is typically worn only once and not lowered around the neck and then brought back over the mouth and nose for reuse. How long one can wear a mask while caring for one patient is the subject of debate. Regardless of the time worn, a mask must be changed before it becomes damp from the wearer's exhalations. See Skill 25-2, pages 695–700 for the recommended practice for applying and removing a mask.

FIGURE 25-3. The N95 health care particulate respirator is NIOSH approved. It meets CDC guidelines for tuberculosis exposure control and is designed specifically for use in a health care setting. *(Source: Courtesy of 3M Health Care.)*

A particulate respirator filters inspired air; surgical masks filter only expired air. One of the most commonly used respirators is the N95 respirator, which is designed to filter airborne particles as small as 1 µm with 95% efficiency and fits comfortably against the face (Fig. 25-3). The elastic straps on these respirators provide more protection and a better fit than the ties on regular surgical masks, but fit-testing is required to ensure health care workers are using the appropriate mask size (CDC, 2020h; OSHA, 2011; Siegel et al., 2019). Once a fit test has been completed to determine the best respirator size, a seal check should be done every time the respirator is worn to ensure an adequate seal (Krah et al., 2018).

The serious increase in the number of multidrug-resistant tuberculosis cases prompted new guidelines to prevent the transmission of this disease. According to CDC guidelines, a NIOSH-certified N95 respirator or higher-level respirator must be worn when entering the airborne infection isolation (AII) room of a patient with known or suspected tuberculosis. These AII rooms are single-occupancy patient rooms designed for airborne transmission with environmental controls including negative pressure, an air flow rate of 6 to 12 air changes per hour, and direct venting of exhaust to the outside or the use of a high efficiency particulate air (HEPA) filter. Other infections or conditions that may be airborne such as EVD, influenza, coronavirus (MERS-CoV and SARS-CoV-2), and Zika viruses require standard, contact, droplet, and/or airborne precautions (CDC, 2019d; Siegel et al., 2019). We will address some of these specific cases later in this chapter.

Think back to ***Jackson Ray Ivers***, the son coming to visit his mother who is hospitalized with a new-onset fever and cough after exposure to a friend with a highly communicable respiratory virus. The nurse would incorporate knowledge of respiratory transmission and appropriate barriers to explain to Mr. Ivers why they need to wear a mask or a respirator while visiting.

Protective Eyewear

Protective eyewear, such as goggles or a face shield, must be available whenever there is a risk of contaminating the mucous membranes of the eyes. For example, suctioning a tracheostomy or assisting with an invasive procedure that may result in splattering of blood or other body fluids requires protection for the caregiver. Plain glasses are unacceptable because side shields are required.

HANDLING AND DISPOSING OF SUPPLIES

Used equipment may be disposed of after use or, if reusable, bagged according to facility policy, sent to a central cleaning area, and sterilized or disinfected. Double bagging may be required if the single bag is not secure or is soiled on the outside. A contaminated item must never be used for another patient.

Some linen bags are water soluble and dissolve in hot water, making it unnecessary for workers to handle the contaminated linen. The use of paper trays and plastic eating utensils does not prevent transmission of organisms and is no longer recommended. The combined hot water and detergent used in commercial dishwashers sufficiently decontaminates dishes, glasses, and utensils. All spills of body fluids or substances must be immediately cleaned with the appropriate chemical germicide or disinfectant.

When collecting a specimen, take care to prevent the outside of the container from becoming contaminated with any secretions or body fluids. Place all laboratory specimens in plastic bags and seal the bags to prevent leakage during transportation. A red bag marked *BIOHAZARD* is used to dispose of trash that contains liquid or semiliquid blood or other potentially infective material (OPIM), trash contaminated with blood or OPIM that would release these substances if compressed, and trash that is caked with dried blood or OPIM and is capable of releasing these materials during handling.

USING STANDARD AND TRANSMISSION-BASED PRECAUTIONS

In addition to barriers, specific precautions have been established to prevent the transmission of infection. Historically, health care workers employ **isolation**, a protective procedure that limits the spread of infectious diseases among hospitalized patients, hospital personnel, and visitors. Infection control programs, interprofessional teams, and other health care workers require a shared understanding of core principles to guide the development of and adherence to policies and procedures designed to create an environment dedicated to infection control and prevention.

Current Centers for Disease Control and Prevention Guidelines

The 2007 CDC guideline (Siegel et al., 2019) recognizes that health care delivery occurs in other settings beside acute care hospitals. This guideline, focused on preventing transmission of infectious agents in myriad health care settings, replaces the 1996 guideline and is updated periodically online as new information becomes available. This publication marks the transition from the narrow term *nosocomial*

infection (hospital-acquired) to the broader term, *health care–associated infection* (associated with health care delivery in any setting). These guidelines reflect the emergence of new pathogens, methods to prevent transmission of multidrug-resistant organisms, and the CDC's concern regarding biologic terrorism. Nurses must understand the various precautions or barrier techniques if they are to use them correctly and minimize infection risks to patients as well as to themselves (see Promoting Health 25-1 on page 674).

The long-standing CDC guidelines (Siegel et al., 2019) continue to designate two tiers of precautions:

- **Standard precautions:** precautions used in the care of all hospitalized patients regardless of their diagnosis or possible infection status. These precautions apply to blood, all body fluids, secretions, excretions (except sweat), nonintact skin, and mucous membranes. New elements included in standard precautions are respiratory hygiene/cough etiquette, safe injection practices, and directions to use a mask when performing high-risk prolonged procedures involving spinal canal punctures. Elements of respiratory hygiene and cough etiquette include education of staff and patients, posted instructions for the population served, review of source control measures (e.g., using masks on patients who are coughing and appropriate use of tissues with sneezes), reinforcement of hand hygiene (especially with managing secretions), and spatial separation when possible.
- **Transmission-based precautions:** precautions used in addition to standard precautions for patients in hospitals with suspected infection with pathogens that can be transmitted by airborne, droplet, or contact routes. The 2007 CDC guidelines include a directive to don PPE when entering the room of a patient with transmission-based precautions, and to remove the PPE only when leaving the room. These categories recognize that a disease may have multiple routes of transmission.

The three types of transmission-based precautions (airborne, droplet, or contact) may be used alone or in combination, but always in addition to standard precautions. Box 25-4 summarizes the current CDC guidelines along with a listing of specific recommendations for both tiers of precautions. Hospitals are encouraged to tailor these recommendations as needed for implementation of their infection control strategy.

Although supported by the CDC and other infection control facilities, the efficacy of using contact precautions to prevent the spread of multidrug-resistant organisms, such as MRSA, continues to be considered. For example, there is little support in the literature for the routine use of contact precautions in MRSA, especially when it is endemic and colonization rates are high. Recommendations continue to support ongoing education of standard precautions and good handwashing (Pryor et al., 2020). As diseases, infections, or conditions emerge or their prevalence increases, guidelines need to evolve. For example, when EVD emerged as an impending issue in 2014, the CDC issued revised guidelines for health care workers caring for these patients. The revised guidelines focus on repeated hands-on training with PPE before treating patients, avoidance of skin or respiratory exposure when PPE is worn, and supervision by a trained monitor during the complex application and removal of PPE.

Recall ***Jackson Ray Ivers***, the son of a patient with a new-onset fever and cough after exposure to a friend with a highly communicable respiratory virus. Based on the nurse's knowledge of disease transmission, the nurse institutes droplet (with occasional airborne) precautions for the patient and instructs Mr. Ivers regarding the need for proper hand hygiene and the use of a mask or respirator.

In late 2019, SARS-CoV-2 and the disease it causes (COVID-19) created a pandemic unlike anything we have seen in the modern world. Since COVID-19 so greatly affected people worldwide, chances are good the section on masks was particularly interesting. Let's take a moment to talk about the underlying infection control principles that guided the experts during COVID-19. Since it is a novel virus, data and the associated specific recommendations were changing rapidly, but the underlying principles were fairly consistently applied. For example, when this first started and the mechanism for transmission was largely unknown, acute care facilities moved to requiring standard, contact, and airborne precautions (respirators and AII rooms) for patients with suspected or diagnosed COVID-19. Finite resources complicated the situation in health care, and there was a move to reuse, reallocate, and reconsider possible alternatives in the move to crisis planning. As experts surveyed the pandemic and had some evidence that COVID-19 was predominantly spread via contact and/or droplet routes, the move was made to consider droplet precautions (masks and face shields) in general health care interactions, as dictated by resources. Respirators were reserved for aerosol-generating procedures (e.g., during endotracheal intubation, a bronchoscopy, or suctioning), where the virus was thought to become airborne and be transmitted via fine/small particle aerosols over greater than 3 ft within a defined airspace. In these instances, the nose and mouth are protected by a particulate respirator, the eyes protected by goggles or a face shield, and the rest of the body protected with gloves and a gown (Siegel et al., 2019). The combination of the rapid spread, previous experience with SARS, an overwhelmed health care system, and core infection control principles, led experts to make some clear infection control recommendations for the general public that included: (1) handwashing, the foundation of all infection control practices, to decrease potential fomite and mucous membrane transfer (especially with untrained mask donning and doffing); (2) handmade cloth masks to prevent the spread of droplets, while protecting the supply of health care grade products for health care workers; (3) social distancing of 6 ft to reflect the estimated distance seen with SARS transmission; and (4) restrictions on large group, especially indoor, activities

Box 25-4 Summary of 2007 CDC Guidelines for Isolation Precautions in Health Care Settings

Standard Precautions (Tier 1)

- *Follow hand hygiene techniques.*
- *Wear clean nonsterile gloves* when touching blood, body fluids, excretions or secretions, contaminated items, mucous membranes, and nonintact skin. Change gloves between tasks on the same patient as necessary and remove gloves promptly after use.
- *Wear personal protective equipment* such as mask, eye protection, face shield, or fluid-repellent gown during procedures and care activities that are likely to generate splashes or sprays of blood or body fluids. Use gown to protect skin and prevent soiling of clothing.
- *Follow respiratory hygiene/cough etiquette.* Any patients, family members, and visitors with undiagnosed, transmissible respiratory infections require education to cover their mouth and nose with a tissue when coughing and promptly dispose of the tissue. During periods of increased occurrence of respiratory infections, offer a surgical mask to coughing patients and other symptomatic people upon entry to the health care facility or office. Encourage the coughing patient to maintain more than a 3-ft separation from other people in the health care facility or office.
- *Avoid recapping used needles.* Choose needles with safety devices that can be activated with one hand. If you must recap, never use two hands. Use a needle-recapping device or the one-handed scoop technique. Place needles, sharps, and scalpels in appropriate puncture-resistant containers after use.
- *Use safe injection practices* including single-dose vials when possible; use disposable needles and syringes for each injection, and prevent contamination of injection equipment and medication.
- *Wear face mask* if placing a catheter or injecting material into the spinal or epidural space.
- *Handle used patient care equipment that is soiled with blood or identified body fluids, secretions, and excretions carefully* to prevent transfer of microorganisms. Clean and reprocess items appropriately if used for another patient.
- *Use adequate environmental controls* to ensure that routine care, cleaning, and disinfection procedures are followed.
- *Review room assignments carefully.* Place patients who may contaminate the environment in private rooms (such as a patient who is incontinent).

Transmission-Based Precautions (Tier 2)

The following precautions are recommended in addition to standard precautions:

Airborne Precautions

Use these for patients who have infections that spread through the air such as tuberculosis, varicella (chicken pox), and rubeola (measles).

- Place patient in a private room that has monitored negative air pressure in relation to surrounding areas, 6 to 12 air changes per hour, and appropriate discharge of air outside, or monitored filtration if air is recirculated. Keep door closed and patient in room.
- Wear a respirator when entering room of patient with known or suspected tuberculosis. If patient has known or suspected rubeola (measles) or varicella (chicken pox), respiratory protection should be worn unless the person entering room is immune to these diseases.
- Transport patient out of room only when necessary and place a surgical mask on the patient if possible.
- Consult CDC guidelines for additional prevention strategies for tuberculosis.

Droplet Precautions

Use these for patients with an infection that is spread by large-particle droplets such as rubella, mumps, diphtheria, and the adenovirus infection in infants and young children.

- Use a private room, if available. Door may remain open.
- Wear PPE upon entry into the room for all interactions that may involve contact with the patient and potentially contaminated areas in the patient's environment.
- Transport patient out of room only when necessary and place a surgical mask on the patient if possible.
- Keep visitors 3 ft from the infected person.

Contact Precautions

Use these for patients who are infected or colonized by a multidrug-resistant organism (MDRO).

- Place the patient in a private room, if available.
- Wear PPE whenever you enter the room for all interactions that may involve contact with the patient and potentially contaminated areas in the patient's environment. Change gloves after having contact with infective material. Remove PPE before leaving the patient environment, and wash hands with an antimicrobial or waterless antiseptic agent.
- Limit movement of the patient out of the room.
- Avoid sharing patient-care equipment.

Source: Adapted from Siegel, J. D., Rhinehart, E., Jackson, M., Chiarello, L., & The Healthcare Infection Control Practices Advisory Committee. (2019, July). *2007 Guideline for isolation precautions: Preventing transmission of infectious agents in healthcare settings (Last update: July 2019).* https://www.cdc.gov/infectioncontrol/pdf/guidelines/isolation-guidelines-H.pdf

where transmission was more likely to occur via droplet or airborne mechanisms.

PREVENTING OCCUPATIONAL EXPOSURES

OSHA developed the Bloodborne Pathogens Standard in 1991 to protect health care workers from exposure or risk of exposure to pathogens such as HIV and HBV. This was revised in 2000 by the passage of The Needlestick Safety and Prevention Act that had more specifications for employers and more detail about how health care providers should participate in decisions and ensure safe practice regarding needlestick injuries and bloodborne exposures (Occupational Safety and Health Administration, 2012). The Needlestick Safety and Prevention Act requires health care providers to:

- Identify and provide safer medical devices that reduce or eliminate injuries from sharps
- Involve health care workers in the selection process of these safer devices

- Provide engineering controls for sharps disposal containers, self-sheathing needles, and other safety devices to reduce or eliminate sharps injuries
- Educate employees regarding how to safely use these devices
- Develop a sharps injury surveillance log

Although sharps injuries declined following the implementation of the revised standards in 2001, that decline has not continued (International Safety Center, 2020). Results from a national survey indicate that, based on data received from 170 hospitals in 2016 and 224 hospitals in 2017, the rate of injuries from sharps has risen every year for the last 3 years and now matches rates reported in 2001 to 2005. Close to 40% of these injuries occurred in surgery, and teaching hospitals had higher rates than nonteaching hospitals (Grimmond & Good, 2019). In an effort to highlight this ongoing issue, many nursing and health care organizations, including the ANA, developed a Consensus Statement and Call to Action that originally focused on: (1) improving sharps safety in the surgical setting, (2) understanding and reducing exposure risks in nonhospital settings, (3) involving front-line health care workers when choosing safety devices, (4) addressing gaps in safety devices and consider innovations, and (5) enhancing education and training. These consensus statements that began in 2010 continue to provide broad recommendations that target health care facilities, professional associations, organizations that set standards, manufacturers, regulatory agencies, and accrediting organizations. The group focuses on a system-level approach that is data-driven and proactive (International Safety Center, 2020).

Needlestick injuries are also a significant occupational hazard for health care workers visiting private homes (see Box 25-5). Keep in mind that although nurses may suffer the largest proportion of needlestick injuries (Grimmond & Good, 2019), it is not always the nurse or original person using the device who sustains the injury. Other clinicians, housekeeping, or laundry staff could also come in contact with these devices and sustain an injury.

The most serious risk associated with needlestick injuries or mucous membrane exposure is the possible risk of infection with pathogens such as HBV, HCV, and HIV. Health care facilities now purchase needles with built-in safety features and needleless, protected, or recessed IV systems. Although this equipment is more expensive, the higher costs may be budget neutral due to fewer needlestick injuries. Knowledge of safety devices and prevention of bloodborne pathogen exposures create a safer workplace environment and protect nurses from potentially life-threatening injuries.

REPORTING ACCIDENTAL EXPOSURES

Although system-level controls must work to minimize exposures and establish a safe work environment (International Safety Center, 2020; NIOSH, 2015), nurses also bear responsibility for their own safety. Any needlestick injury or accidental exposure to blood or body fluids must be reported immediately so that appropriate action can be taken. Underreporting of exposures is believed to be widespread. Reasons for not reporting exposures include belief that the injury is insignificant or that the actual risk is relatively small, reporting it requires too much time, concern about negative consequences if the injury is reported, and belief that these types of injuries are to be expected. It is imperative that nurses and other health care workers report these injuries promptly so that they receive any appropriate postexposure treatment and prophylaxis. A facility's plan for this type of exposure typically includes the following recommendations supported by the CDC and NIOSH (National Clinician Consultation Center, 2020):

- Immediate management of the exposure site—wash the exposed area immediately with warm water and soap, flush mucous membranes, or irrigate eyes
- Immediate, detailed report of the incident to the facility, with likely completion of an incident or injury report
- Baseline testing of the source person first, with permission, to determine HCV, HBV, and HIV status (rapid HIV testing preferred); baseline testing of the exposed person indicated with positive results from the source person; note if the exposed person is considered immune to HBV with documented positive titer and requires no further testing or follow-up
- Postexposure prophylaxis (PEP), if recommended; consideration of pregnancy and lactation

Box 25-5 Preventing Needlestick Injuries to Home Health Care Workers

Nurses working in private homes need to be aware of the factors that contribute to risks in these settings. They include:

- Avoid using needles whenever safe and effective alternatives are available.
- Use needles with safety devices; void recapping or bending needles that might be contaminated.
- Bring standard-labeled, leak-proof, puncture-resistant sharps containers to the patients' homes and promptly dispose of used needles and sharps in this container.
- Plan for safe handling and disposal of needles before use.
- Keep sharps container out of the reach of children, pets, and anyone not needing access to it.
- Ensure that sharps container is secure to prevent spilling before transporting it.
- Follow standard precautions, infection prevention, and general hygiene practices consistently.
- Participate in your employer's bloodborne pathogens training program.
- Help your employer elect and evaluate safety devices and equipment.
- Use devices with safety features provided by your employer.
- Report any needlestick or other sharps injury immediately to your employer.

Source: Adapted from National Institute for Occupational Safety and Health (NIOSH). (2012b). *NIOSH Fast Facts–Home healthcare workers: How to prevent needlestick and sharps injuries.* DHHS (NIOSH) Publication No. 2012–123. http://www.cdc.gov/niosh/docs/2012-123/pdfs/2012-123.pdf

- Follow-up testing as recommended—can be at 6 weeks, 3 months, and/or 12 months, depending on the exposure
- Counseling sessions regarding safe practices to protect self and others

PROVIDING CARE IN SPECIAL SITUATIONS

Occasionally, nurses need to use neutropenic precautions for a patient whose immune system is compromised (e.g., recovering from transplantation surgery or receiving chemotherapy). Those who are immunosuppressed more often than not become infected by organisms harbored in their own bodies, rather than by pathogens present in the environment or transmitted from other people. As with all hospitalized patients, standard precautions are required, but some additional measures are helpful when a patient's ability to withstand any bacterial invasion is compromised.

Recommendations in this situation include the following:

- Ensure that health care provider is healthy
- Restrict visits from friends and family members who have colds or contagious illnesses
- Avoid collection of standing water in the room (e.g., humidifiers) to prevent bacteria typically found in this water
- Avoid plants and flowers—soil is a source of bacteria and mold
- Follow hospital protocols regarding PPE for neutropenic precautions

The latest CDC (Siegel et al., 2019) guideline also addresses environmental controls that foster a *protective environment* to decrease the risk of infection in the most severely immunocompromised patients.

The increasing number of people who are ill or immunocompromised, coupled with increasingly virulent organisms, poses sterilization and disinfection concerns for home environments. Common measures that reduce the risk of infection at home include the following (OncoLink, 2020):

- Wash hands frequently—for the affected person and everyone who comes in contact with the affected person—especially before preparing food, before eating, and after using the restroom
- Maintain a clean home and frequently use household disinfectants and antibacterial wipes
- Avoid sharing personal items
- Perform regular, thorough oral care using a soft-bristled toothbrush
- Minimize the risk of injury—avoid sunburn, cuts, suppositories, tampons, and intercourse/penetration with sexual paraphernalia/oral sex
- Do not handle animal waste
- Avoid crowds, public pools, and adults or children who are sick or recently vaccinated
- Clean and disinfect kitchen surfaces, especially when preparing meat, chicken, and fish
- Cook food to the proper internal temperature; promptly refrigerate or freeze perishables, prepared foods, and leftovers
- Avoid raw meat and fish; wash all fresh fruits and vegetables; avoid soft cheese; use only pasteurized products; pay attention to sell-by dates

Controlling disease and preventing infections from spreading is a vital home care consideration for everyone.

Using Surgical Asepsis

Surgical asepsis techniques, used regularly in the operating room, labor and delivery areas, and certain diagnostic testing areas, are also used by the nurse at the patient's bedside. Procedures that involve the insertion of a urinary catheter, sterile dressing changes, or preparing an injectable medication are examples of surgical asepsis techniques. An object is considered sterile when all microorganisms, including pathogens and spores/endospores, have been destroyed. For example, the needle for an injection must be handled so that it is sterile when inserted into a patient. Sterile forceps or gloves are used to handle sterile dressings to protect against contamination. The basic principles of surgical asepsis are listed in Box 25-6 (on page 688).

When observing *medical asepsis* (clean technique), areas are considered contaminated if they bear or are suspected of bearing pathogens; whereas when following *surgical asepsis* (sterile technique), areas are considered contaminated if they are touched by any object that is not also sterile. One of the most important aspects of surgical and medical asepsis is that the effectiveness of both depends on faithful and conscientious practice by those performing them. It is far better to err on the side of safety when using surgical asepsis than to take the slightest chance of possible contamination. Being a patient advocate requires vigilant aseptic technique and a willingness to speak up if the patient's safety has been compromised by improper procedures.

Think back to **Esther Bailey**, the woman described in the Reflective Practice box (on page 664). The nurse acted appropriately by speaking up about the possible contamination of the catheter. Had this catheter been used, the patient's safety would have been compromised.

Explaining the surgical asepsis procedure to patients facilitates their cooperation. Inform the patient about which objects and areas may not be touched and direct the patient to avoid sudden movements that might contaminate the equipment. This helps the patient assist in maintaining the sterility of the procedure.

OPENING A STERILE PACKAGE AND PREPARING A STERILE FIELD

Commercially prepared sterile items may be sealed in paper or packaged in plastic containers. Sterile packages may be opened on a flat surface or while held in the hands. Skill 25-3 on pages 701–705 illustrates how to open a sterile package and prepare a sterile field. A sterile item should be covered if

Box 25-6 Practicing Basic Principles of Surgical Asepsis

- Allow only a sterile object to touch another sterile object. Unsterile touching sterile means contamination has occurred.
- Open sterile packages so that the first edge of the wrapper is directed away from the worker to avoid the possibility of a sterile surface touching unsterile clothing. The outside of the sterile package is considered contaminated. Opening a sterile package is shown and described in Skill 25-3 on pages 701–705.
- Avoid spilling any solution on a cloth or paper used as a field for a sterile setup. The moisture penetrates through the sterile cloth or paper and carries organisms by capillary action to contaminate the field. A wet field is considered contaminated if the surface immediately below it is not sterile.
- Hold sterile objects above the level of the waist. This will ensure keeping the object within sight and preventing accidental contamination.
- Avoid talking, coughing, sneezing, or reaching over a sterile field or object. This helps to prevent contamination by droplets from the nose and the mouth or by particles dropping from the worker's arm.
- Never walk away from or turn your back on a sterile field. This prevents possible contamination while the field is out of the worker's view.
- Keep all items sterile that are brought into contact with broken skin or used to penetrate the skin to inject substances into the body or to enter normally sterile body cavities. These items include dressings used to cover surgical incisions, needles for injection, and tubes (catheters) used to drain urine from the bladder.
- Use dry, sterile forceps when necessary. Forceps soaked in disinfectant are not considered sterile.
- Consider the edge (outer 1 inch) of a sterile field to be contaminated.
- Consider an object contaminated if you have any doubt as to its sterility.

it is not used immediately. Reapply the cover by touching only the outside of the wrapper and reversing the opening order.

POURING STERILE SOLUTIONS

Care is necessary when pouring sterile liquids onto a sterile dressing or into a sterile basin. The outer surfaces of the bottle and cap are considered unsterile, whereas the inside areas and the solution are considered sterile. After a solution has been opened, the outer bottle should be labeled with date and time if it is to be reused. Most solutions are considered sterile for 24 hours after they are opened. When pouring from a bottle, grasp the bottle so that the label is in the palm of your hand. This action prevents any of the liquid from running over the label and making it illegible. Avoid splashing the liquid since this would contaminate the sterile field (see Skill 25-3, pages 701–705).

ADDING STERILE SUPPLIES TO A STERILE FIELD

After establishing a sterile field, it may be necessary to add items such as instruments or additional supplies to the sterile field. Item 6 in Skill 25-3 on pages 701–705 demonstrates this technique. Once a sterile field is established, objects on a field may be handled only by using sterile forceps or with hands wearing sterile gloves.

PUTTING ON STERILE GLOVES

Sterile gloves are donned in a way that allows only the inside of the gloves to come in contact with the hands. Skill 25-4 on pages 706–709 describes the proper technique for putting on sterile gloves.

After the gloves are on, only sterile items may be handled with the sterile-gloved hands. Careful removal of the gloves reduces any hand contact with contaminated materials. Good hand hygiene technique before and after putting on sterile gloves is imperative.

POSITIONING A STERILE DRAPE

The sterile drape, which ideally is waterproof, may be used to extend the sterile working area. Using sterile gloves allows the nurse to handle the entire drape surface. For protection when positioning, fold the upper edges of the drape over the sterile-gloved hands (Fig. 25-4). When sterile gloves are not worn, the nurse can touch only the outer 1 inch (2.5 cm) of the drape. Use caution when gently shaking the drape open so as not to touch one's clothing or an unsterile object. Hold the drape by the 1-inch upper edge and position the drape over the desired area. Do not reach over the drape because this would contaminate the sterile area.

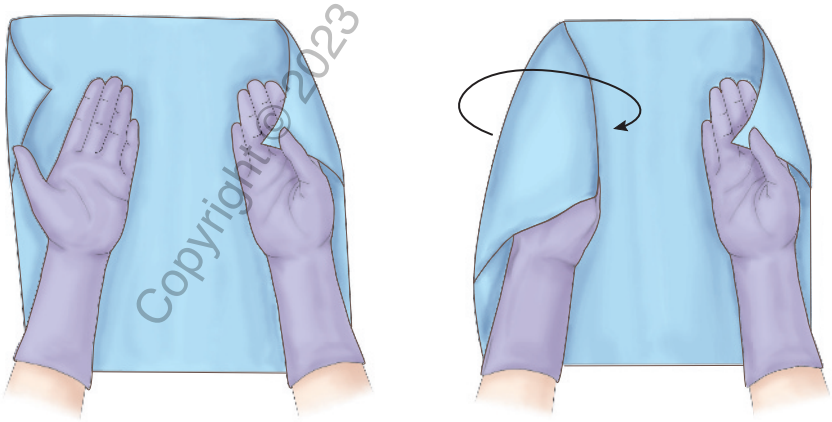


FIGURE 25-4. Techniques for cuffing a sterile drape over gloved hands.

Through the Eyes of a Student

She was the cutest little girl I have ever known. She was infected with HIV from birth. Her mother used illicit IV drugs and engaged in condomless vaginal sex with multiple partners. This little girl, who came into the world with an innocent, fresh, new face full of unconditional love, could not walk, could not talk, could not chew, and could not control her urine or bowel movements—but she could smile unlike any other child! In the beginning, I was so terrified of contracting HIV that I couldn't walk into her room without a mask, gown, gloves, protective eyewear, and basically a full protective body spacesuit. At the end of my time with her, I wanted to take her into my home and give her all the love, support, and care she needed. I am not saying that I didn't wear gloves when I changed her diapers or when I flushed her saline lock because I did … I was very careful. But I realized that she is a person, a person full of feelings, a person who needed me, and from whom I could learn. People with the HIV virus are just that—people. We need to learn to treat them as such.

I also learned not to fear the person who is diagnosed with HIV infection or AIDS. I know that I will remember to take the proper safety precautions with this person. But I also need to have a healthy respect for the virus and check any unconscious bias when I happen to think a particular patient is or isn't the "type of person" to have HIV. If I don't consistently use standard precautions, it is possible that one day I'll become infected through contact with someone who is "not the type." If that should ever happen, I hope everyone who cares for me will treat me as a real person and not be afraid.

—Karmi N. Soder, Georgetown University, Washington, DC

Meeting Needs of Patients Requiring Infection Control Precautions

The psychological implications of infection control precautions are usually great, whether the patient is strictly separated from others or needs only to observe relatively simple precautions (see the accompanying box, Through the Eyes of a Student).

The current CDC standard precautions treat all people in a similar manner and greatly minimize the psychological trauma of feeling unclean and undesirable, which often occurred with earlier measures. However, sensory deprivation and loss of self-esteem may occur with transmission-based precautions. For example, during the pandemic that began in 2019, when shelter in place orders were in effect, when high-risk populations were encouraged to remain home, when nursing homes were in lockdown, and when family was relegated to online socialization, older adults around the world experienced profound social isolation. Unfortunately, social isolation can lead to poor physical and mental health. Specific strategies to mitigate this loneliness and build social connections included public health positive messaging, mobilizing family and community-based resources, developing accessible technology-based interventions to engage older adults, and encouraging the health care team to consider social isolation and loneliness in their health care systems (Wu, 2020). For hospitalized patients in isolation at any time, friends and relatives may be forbidden to visit. Visitors as well as health care personnel may be inclined to spend less time with the patient because they are afraid that they will contract the disease or because of the inconvenience (and discomfort) of donning, wearing, then doffing the required PPE (e.g., gowns, masks, respirators, shoe covers, and face shields). This may lead to inconsistent recording of vital signs, irregular documentation, and less patient monitoring on the part of caregivers. Research has also verified that patients placed in isolation because of the presence of a communicable disease may suffer unintended consequences such as an increase in incidents of depression and/or anxiety, fewer and shorter visits from health care providers, and a decrease in satisfaction (Kullar et al., 2016). Nursing measures to help prevent the sensory deprivation and loss of self-esteem associated with isolation precautions are discussed in Chapters 42 and 45.

Health teaching about transmission-based precautions can ease the fears of patients and family members. Both must understand the pertinent epidemiologic facts and how to carry out the specific precautions. It is helpful to emphasize the following:

- Precautions are temporary
- A clear description of the precautions and protective equipment worn by the staff to protect the patient, the caregiver, and other patients
- Proper hand hygiene before and after visiting the patient is the most effective measure to prevent spread of the disease
- Continued explanations about procedures and continued updates on progress help to empower the patient

Nurses must document their health teaching about barrier precautions in the patient's care plan. A well-informed nurse who understands how to protect both self and patients, and a well-informed patient who is cooperating in one's own care, create the best infection-prevention team.

Raising Ethical Concerns About Infection Risks

Infection control and precautions minimize infection risks for patients as well as health care workers. However, the increasing numbers of people infected with HIV, HBV, and HCV have led to serious ethical concerns and controversy related to the risk for transmitting these diseases. The rights of the patient may conflict with the rights of the health care worker and the health care facility. Refer to the accompanying box, Nursing Advocacy in Action (on page 690), for an example of a situation in which the nurse must reconcile the patient's right to make choices versus the well-being of family members.

Nursing Advocacy in Action

Patient Scenario

Mrs. Samol is a 38-year-old patient in the medical ICU who is dying of AIDS-related complications. Since being diagnosed with AIDS, she has refused to inform her husband and family of her AIDS status. She even has an advance directive, which forbids the disclosure of her diagnosis when she can no longer advocate for herself. Her husband and mother cannot understand why the doctors and nurses cannot treat her "pneumonia"—the only diagnosis she gave them. The doctors and nurses caring for Mrs. Samol believe that her husband has the right to know his wife's diagnosis so that he can make decisions in his own best interest about being tested, having their children tested, etc.

Implications for Nursing Advocacy

What would you do if you were Mrs. Samol's nurse? Talk with your classmates and experienced nurses about the questions that follow.

- If you elect to advocate for the Samols, what practical steps can you take to ensure better health outcomes? Are there any legal guidelines for what you can and cannot do?
- What is reasonable to expect of a student nurse, a graduate nurse, and an experienced nurse in this situation?
- What advocacy skills are needed to effectively respond to this challenge?

Questions such as the following are being debated:

- Should all hospitalized patients be routinely tested for HCV infection?
- Should HBV testing be mandatory for all foreign-born residents of the United States?
- Should health care workers infected with HIV be permitted to perform exposure-prone invasive procedures?
- Should you address hand hygiene with another RN who you have observed never washes their hands after removing gloves?
- Should pregnant health care providers be expected to care for patients with infectious diseases?
- Since standard precautions are sufficient to protect health care workers from HIV, is there a need to include this information in SBAR report? Were it not for the family dynamics should this even be mentioned?

The CDC and various medical and nursing groups are seeking consensus on these issues, based on scientific information and valid statistical evidence. Although the CDC has issued guidelines related to these topics, not all states have adopted the guidelines. In addition, some states have revised them. All agree, however, that health care workers who conscientiously adhere to appropriate infection control precautions significantly reduce the risk for infection for patients and themselves.

Working With the Infection Preventionist

In the hospital, the nurse is responsible for the collection of statistics about infection and for educating patients and staff about effective infection control techniques. Many hospitals rely on this specialized practitioner, referred to as the infection preventionist, who has demonstrated expertise in specific competencies including (Billings et al., 2019):

- Epidemiology and surveillance
- Leading investigations and surveillance programs (using surveillance technology as appropriate)
- Preventing and controlling the transmission of infectious agents
- Managing and communicating plans and feedback, as well as performance improvement and patient safety initiatives
- Leading institutions through risk assessment and implementation stages
- Leading education, research, and performance improvement activities
- Overseeing employee/occupational health

Intensive investigative strategies create a positive environment that significantly reduces the incidence of HAIs in health care facilities. The infection preventionist knows the devastating effects of infection and is intent on promoting a safe environment while fostering a systematic approach to infection control.

In the home, the infection preventionist's duties include surveillance for facility-associated infections, education, consultation, epidemiologic investigation, quality-improvement activities, and policy and procedure development. OSHA regulations state that home care facilities must have an infection control program and that OSHA infection control standards and policies must be available to all staff for reference.

Teaching About Infection Control

Teaching about medical asepsis and infection control is a challenging nursing responsibility. Patients need to be aware of techniques that prevent the spread of infection and their rationale. COVID-19 provides a good exemplar of how misconceptions about mask requirements/recommendations belied the altruistic nature and adherence to the social contract exhibited by donning a mask in public—cloths masks did not necessarily protect the masked, they protected the community and individuals with whom the masked person came into contact. Use of the nursing process in infection control protects both the patient and the nurse.

Medical aseptic techniques are appropriate for most procedures in the home, except for self-injection technique and venous or dialysis catheter care, which require surgical asepsis. The patient frequently must make adjustments and improvise with the resources and supplies available for their use. In addition, the nurse emphasizes effective hand hygiene and other hygiene practices that interrupt the infection cycle. To satisfy OSHA requirements, many home care facilities have either a full-time or part-time infection preventionist. The Association for Professionals in Infection Control and Epidemiology (APIC, n.d.), an interprofessional organization dedicated to improving patient safety and health by reducing the risk of infection, has specific implementation guides that may be useful for educational initiatives: http://www.apic.org/Professional-Practice/Implementation-guides (see Additional Resources).

Teach patients to use basic principles of asepsis at home and in public facilities. These involve the activities of daily living (see Chapter 32 for a discussion of personal hygiene). Here are examples of medical asepsis practices recommended in the home:

- Wash hands before preparing food and before eating
- Prepare foods at temperatures high enough to ensure that they are safe to eat (e.g., preparation of fresh meat)
- Wash hands, cutting boards, and utensils with hot, soapy water before and after handling raw poultry and meat
- Keep foods refrigerated, especially those containing mayonnaise
- Wash raw fruits and vegetables before serving them
- Use pasteurized milk and fruit juices
- Wash hands after using the bathroom
- Use individual personal care items, such as washcloths, towels, and toothbrushes, rather than sharing

Note that neutropenic precautions and practices associated with medical asepsis are similar in many respects. The principles of medical asepsis are general and form a solid foundation for the more specific neutropenic precautions.

Think back to ***Giselle Turheis***, the woman with leukemia and a compromised immune system. When teaching the patient about measures to prevent infection, the nurse would stress the use of proper practices in the home to reduce the patient's risk for infection.

Teach patients about ways to prevent infection in public facilities, such as the following:

- Wash hands after using any public bathroom
- Use paper towels or hot-air dryers in restrooms
- Use individually wrapped drinking straws
- Use tongs to lift food from common service trays in cafeterias, food stores, and salad bars

The community reinforces medical asepsis practices in various ways, including the following:

- Using sterilized combs and brushes in barber and beauty shops
- Performing examination of food handlers for evidence of disease
- Encouraging food handlers to receive the hepatitis A vaccination
- Enforcing frequent handwashing by food handlers

Evaluating

Nurses as primary caregivers can intervene in and positively affect a patient's outcome. By assessing the person at risk, identifying actual and potential health problems and needs, planning, and intervening to maintain a safe environment, the nurse can reduce a patient's potential for developing an infection.

Evaluation of the care plan determines whether the person's need for safety is being met effectively. Ongoing systematic evaluation is crucial for nurses who strive to maintain a secure environment for their patients as well as for themselves. If patient goals have been met and evaluative criteria have been satisfied, the patient will accomplish the following:

- Correctly use techniques of medical asepsis
- Identify health habits and lifestyle patterns that promote health
- State the signs and symptoms of an infection
- Identify unsafe situations in the home environment

REFLECTIVE PRACTICE LEADING TO PERSONAL LEARNING

Remember that the object of reflective practice is to look at an experience, understand it, and learn from it. As you begin to develop your expertise in evaluating the care plan, reflect on your experiences—successes and failures—in order to improve your practice. How can you do it better next time? What did you learn today that can help you tomorrow? Begin your reflection by paying close attention to the following:

- How consistently do you personally adhere to asepsis and infection control practices? How would you respond to constructive/critical feedback from a peer regarding your aseptic technique?
- What value do you attach to involving the patient in infection control practices? How do you individualize the care for patients when so many guidelines, policies, and procedures dictate your care?
- Did your experience with asepsis and infection control techniques change your perspective on the necessity of guidelines? What plan do you have to stay abreast of evolving recommendations at the facility, local, state, national, and global levels?
- How did you prioritize the data you collected? What patterns in the data did you identify? What knowledge from your learning, personal experience and intuition did you use to make decisions and develop your plan of care regarding infection control and prevention practices?

Keeping up with the latest evidence-based practice guidelines can be challenging. Multi-resistant organisms, evolving patterns of transmission, and the spread of disease and infection outside of endemic areas require diligence on the part of the health care professional. Balancing the needs of your individual patients with these responsibilities requires mindfulness and intentionality.

Perhaps the most important questions to reflect on are: Are your patients and their families/caregivers better for having had *you* share in the critical responsibility of partnering with them to ensure appropriate aseptic and infection control practices? Are your patients now receiving thoughtful, person-centered, prioritized, holistic, evidence-based treatment and care because of your efforts?

Skill 25-1 Performing Hand Hygiene Using Soap and Water (Handwashing)

DELEGATION CONSIDERATIONS

The application and use of hand hygiene using soap and water are appropriate for all health care providers.

EQUIPMENT

- Antimicrobial or nonantimicrobial soap (if in bar form, soap must be placed on a soap rack)
- Paper towels
- Moisturizing hand lotion or cream approved by health care facility (optional)

IMPLEMENTATION

ACTION	RATIONALE
1. Gather the necessary supplies. Stand in front of the sink. Do not allow your clothing to touch the sink during the washing procedure (Figure 1).	The sink is considered contaminated. Clothing may carry organisms from place to place.
2. Remove jewelry prior to patient contact, if possible, and secure in a safe place. A plain band may remain in place, based on facility policy.	Microorganisms may accumulate in settings of jewelry and underneath rings (CDC, 2019b), so it should not be worn during patient care. If jewelry was worn during care, it should be left on during handwashing.
3. Turn on water and adjust force (Figure 2). Regulate the temperature until the water is warm.	Water splashed from the contaminated sink will contaminate clothing. Warm water is more comfortable and is less likely to open pores and remove oils from the skin. Organisms can lodge in roughened and broken areas of chapped skin.

FIGURE 1. Standing in front of sink.

FIGURE 2. Turning on the water at the sink.

4. Wet the hands and wrist area. Keep hands lower than elbows to allow water to flow toward fingertips (Figure 3).	Water should flow from the cleaner area toward the more contaminated area. Hands are more contaminated than forearms.
5. Use about 1 teaspoon liquid soap from dispenser or rinse bar of soap and lather thoroughly, using a firm circular motion (Figure 4). Alternatively, use the amount of product recommended by the manufacturer. Cover all areas of hands with the soap product. If using bar soap, rinse soap bar again and return to soap rack without touching the rack.	Rinsing the soap before and after use removes the lather, which may contain microorganisms.

FIGURE 3. Wetting hands to the wrist.

FIGURE 4. Lathering hands with soap and rubbing with firm circular motion.

ACTION	RATIONALE
6. Continuing with firm rubbing and circular motions. Wash the palms and backs of the hands; each finger; the areas between the fingers (Figure 5); and the knuckles, wrists, and forearms. **Wash at least 1 inch above area of contamination.** If hands are not visibly soiled, wash to 1 inch above the wrists (Figure 6).	Friction caused by firm rubbing and circular motions helps to loosen dirt and organisms that can lodge between the fingers, in skin crevices of knuckles, on the palms and backs of the hands, and on the wrists and forearms. Cleaning less contaminated areas (forearms and wrists) after hands are clean prevents spreading microorganisms from the hands to the forearms and wrists.

FIGURE 5. Washing areas between fingers.

FIGURE 6. Washing to 1 inch above the wrist.

7. Continue this friction motion for at least 15 to 20 seconds.	Effective handwashing requires at least a 15- to 20-second scrub with plain soap or disinfectant and warm water (CDC, 2019b). Hands that are visibly soiled need a longer scrub.
8. Use fingernails of the opposite hand to clean under fingernails (Figure 7).	The area under nails has a high microorganism count, and organisms may remain under the nails, where they can grow and be spread to other people.
9. Rinse hands thoroughly under running water with water flowing toward fingertips (Figure 8).	Running water rinses microorganisms and dirt into the sink.

FIGURE 7. Using fingernails to clean under nails of opposite hand.

FIGURE 8. Rinsing hands under running water with water flowing toward fingertips.

10. Pat hands dry with a paper towel, beginning with the fingers and moving upward toward forearms, and discard it immediately. Use another clean towel to turn off the faucet. Discard towel immediately without touching other clean hand.	Patting the skin dry prevents chapping. Dry hands first because they are considered the cleanest and least contaminated area. Turning the faucet off with a clean paper towel protects the clean hands from contact with a soiled surface.

(*continued on page 694*)

Skill 25-1 Performing Hand Hygiene Using Soap and Water (Handwashing) *(continued)*

ACTION	RATIONALE
11. Use moisturizing hand lotion or cream, as approved by facility policy.	Moisturizing hand lotion or cream helps to increase skin hydration to keep the skin soft and prevents dermatitis. It is best applied after patient care is complete, from a small, personal container, according to facility policy. Avoid use of unapproved lotions or creams because they can cause deterioration of gloves or decrease the efficacy of som providers should educate patients, family Follow facility policy.

DOCUMENTATION

The performance of handwashing is not generally documented.

DEVELOPING CLINICAL REASONING AND CLINICAL JUDGMENT

SPECIAL CONSIDERATIONS

General Considerations

- The use of gloves does not eliminate the need for hand hygiene.
- The use of hand hygiene does not eliminate the need for gloves.
- Ensure hands are dry before gloves are donned to decrease risk of dermatitis (Halm & Sandau, 2018).
- Hand hygiene performance by patients is an important intervention to reduce acquisition and transmission of HAIs (Srigley et al., 2020; Wong et al., 2020).
- Hand hygiene performance by family and non-family visitors to health care facilities is an important intervention to reduce acquisition and transmission of HAIs (Kim & Lee, 2019; Lary et al., 2020).
- Health care providers should educate patients, family, and nonfamily visitors on the importance of hand hygiene. Informed patients, families, and visitors have the ability to be better engaged as members of the health care team and are better able to advocate for themselves (Kim & Lee, 2019; Lary et al., 2020).
- Health care consumers in all settings should be encouraged to "speak up for clean hands" and advocate for the use of hand hygiene by health care providers, family, and friends (CDC, 2016a; Gesser-Edelsburg et al., 2020).
- Germs can live under artificial fingernails before and after hand hygiene interventions. Health care providers should not wear artificial fingernails or extensions when having direct contact with patients at high risk (e.g., patients in intensive care units or operating rooms) (CDC, 2019b).
- Health care providers should keep natural nail tips less than ¼-inch long (CDC, 2019b)

Community-Based Care Considerations

- Proper hand hygiene, including the use of alcohol-based hand sanitizers, is useful to reduce the risk of spread of microorganisms among family members and friends (CDC, 2016a). Patients, family members, and caregivers should be encouraged to perform hand hygiene, preferably by washing their hands; washing with soap and water is the best way to remove germs in most situations (CDC, 2020b). If soap and water are not readily available, alcohol-based hand sanitizer should be used (CDC, 2020b). Instruct patients, family members, and caregivers to perform hand hygiene (CDC, 2016a):
  - before preparing or eating food
  - before touching eyes, nose, or mouth
  - before and after changing wound dressings or bandages
  - after using the restroom
  - after blowing their nose, coughing, or sneezing
  - after touching hospital or other health care–setting surfaces such as doorknobs, phones, tables, and bed rails

Skill 25-2 Using Personal Protective Equipment

DELEGATION CONSIDERATIONS

The application and use of PPE are appropriate for all health care providers.

EQUIPMENT

- Gloves
- Mask (surgical or particulate respirator)
- Impervious gown
- Goggles or face shield (protective eye wear; does not include eyeglasses)

Note: Equipment for PPE may vary depending on level of precautions required and facility policy.

IMPLEMENTATION

ACTION	RATIONALE
1. Check medical record and plan of care for type of precautions and review precautions in infection control manual.	Mode of transmission of organism determines type of precautions required.
2. Plan nursing activities before entering patient's room.	Organization facilitates performance of task and adherence to precautions.
3. Provide instruction about precautions and use of PPE to patient, family members, caregivers, and visitors.	Explanation encourages cooperation of patient, family, and caregivers and reduces apprehension about precaution procedures.
 4. Perform hand hygiene.	Hand hygiene prevents the spread of microorganisms.
5. Put on gown, mask (surgical or particulate respirator), protective eyewear, and gloves based on the type of exposure anticipated and category of isolation precautions.	Use of PPE interrupts chain of infection and protects patient and nurse. Gown should protect all clothing and exposed skin on upper extremities. Gloves protect hands and wrists from microorganisms. Masks and particulate respirators protect wearer from direct contact with body fluids that may spray or splash; masks protect wearer from exposure to large-particle aerosols and particulate respirators protect wearer from inhalation of airborne droplet nuclei, and small-particle aerosols. Eyewear protects mucous membranes in the eye from splashes.
a. Put on the gown, with the opening in the back. Tie gown securely at neck and waist (Figure 1).	Gown should fully cover the torso from the neck to knees, arms to the end of wrists, and wrap around the back.
b. Put on the mask or respirator over your nose, mouth, and chin (Figure 2). Secure ties or elastic bands at the middle of the head and neck. Fit mask snug to face and below chin. Fit flexible band to nose bridge. If respirator is used, perform a fit check. Inhale: The respirator should collapse. Exhale: Air should not leak out.	Masks protect nurse or patient from droplet nuclei and large-particle aerosols. A mask must fit securely to provide protection.

FIGURE 1. Tying gown at neck and waist.

FIGURE 2. Applying mask over nose, mouth, and chin.

(*continued on page 696*)

Skill 25-2 Using Personal Protective Equipment *(continued)*

ACTION	RATIONALE
c. Put on goggles (Figure 3). Place over eyes and adjust to fit. Alternatively, a face shield could be used (Figure 4).	Eyewear protects mucous membranes in the eye from splashes; it must fit securely to provide protection.

FIGURE 3. Putting on goggles.

FIGURE 4. Putting on face shield.

d. Put on clean disposable gloves. Extend gloves to cover the wrist of the gown (Figure 5).	Gloves protect hands and wrists from microorganisms.

FIGURE 5. Putting on gloves, ensuring gloves cover gown cuffs.

6. Identify the patient. Explain the procedure to the patient. Continue with patient care as appropriate.	Patient identification validates the correct patient and correct procedure. Discussion and explanation help allay anxiety and prepare the patient for what to expect.

Remove PPE

There are a variety of ways to remove PPE to achieve the goal of safe removal without contamination of clothes, skin, or mucous membranes (CDC, 2007; updated 2019). Two methods are outlined here, based on CDC recommendations.

Method A

7. Remove PPE: Except for respirator, if worn, remove PPE before exiting the patient room or in an anteroom. **Remove respirator after leaving the patient's room and closing the door.**	Proper removal prevents contact with and the spread of microorganisms. Removing respirator outside the patient's room prevents contact with airborne microorganisms.
a. **Outside of gloves are contaminated.** If hands are contaminated during gown or glove removal, immediately perform hand hygiene.	Outside front of equipment is considered contaminated. Hand hygiene prevents transmission of microorganisms.
	The inside, outside back, and ties on head and back are considered clean, which are areas of PPE that are not likely to have been in contact with infectious organisms.

ACTION	RATIONALE
b. Grasp the palm area of one gloved hand with the opposite gloved hand and peel off first glove, turning the glove inside out as you pull it off (Figure 6). Hold the removed glove in the remaining gloved hand.	Outside of gloves are contaminated. This process contains the contaminated areas.
c. Slide fingers of ungloved hand under the remaining glove at the wrist, **taking care not to touch the outer surface of the glove** (Figure 7).	Ungloved hand is clean and should not touch contaminated areas.

FIGURE 6. Grasping the palm area of one glove and peeling off.

FIGURE 7. Sliding fingers of ungloved hand under the remaining glove at the wrist.

d. Peel off the second glove over the first glove, containing the first glove inside the other (Figure 8). Discard in appropriate container.	This process contains the outside, contaminated areas of gloves. Proper disposal prevents transmission of microorganisms.
e. To remove the goggles or face shield: **Outside of goggles or face shield is contaminated—do not touch.** If hands are contaminated during goggle or face shield removal, immediately perform hand hygiene. Handle by the headband or earpieces and remove from the back (Figure 9). Lift away from the face. **Do not touch the front of goggles or face shield.** Place in designated receptacle for reprocessing or in an appropriate waste container.	Outside of goggles or face shield is contaminated; do not touch. Hand hygiene prevents transmission of microorganisms. Handling by headband or earpieces and lifting away from face prevents transmission of microorganisms. Proper disposal prevents transmission of microorganisms.

FIGURE 8. Peeling off the second glove, containing the first glove inside the other.

FIGURE 9. Removing goggles by grasping earpieces.

(*continued on page 698*)

Skill 25-2 Using Personal Protective Equipment *(continued)*

ACTION	RATIONALE
f. To remove gown: **Gown front and sleeves are contaminated.** If hands are contaminated during gown removal, immediately perform hand hygiene. Unfasten ties, if at the neck and back, taking care that sleeves of gown do not contact the body. Allow the gown to fall away from shoulders. **Touching only the inside of the gown**, pull away from the neck and shoulders (Figure 10). Keeping hands on the inner surface of the gown, pull gown from arms (Figure 11). Turn gown inside out. Fold or roll into a bundle (Figure 12) and discard in an appropriate waste container.	Gown front and sleeves are contaminated. Hand hygiene prevents transmission of microorganisms. Touching only the inside of the gown and pulling it away from the torso prevents transmission of microorganisms. This process contains the outside, contaminated areas of gown. Proper disposal prevents transmission of microorganisms.
g. To remove mask or respirator: **Front of mask/respirator is contaminated—do not touch.** If hands are contaminated during mask/respirator removal, immediately perform hand hygiene. Grasp the bottom ties or elastic of the mask/respirator, then top ties or elastic and remove. **Do not touch the front of mask or respirator** (Figure 13). Discard in an appropriate waste container. If using a reusable respirator, save for future use in the designated area.	Front of mask or respirator is contaminated; do not touch. Not touching the front of the mask and proper disposal of the mask prevent transmission of microorganisms.

FIGURE 10. Touching only the inside of the gown, pull away from the neck and shoulders.

FIGURE 11. Keeping hands on the inner surface of the gown, pull gown from arms.

FIGURE 12. Turning gown inside out, rolling into a bundle.

FIGURE 13. Removing mask or respirator, grasping the neck ties or elastic, taking care to avoid touching the front.

ACTION	RATIONALE
 8. Perform hand hygiene immediately after removing all PPE.	Hand hygiene prevents spread of microorganisms.
Remove PPE	
There are a variety of ways to remove PPE to achieve the goal of safe removal without contamination of clothes, skin, or mucous membranes (CDC, 2007; update, 2019).	
Method B	
7. To remove gown and gloves: **Gown front and sleeves and the outside of gloves are contaminated.** If hands are contaminated during gown and glove removal, immediately perform hand hygiene. **Touching outside of gown only with gloved hands**, grasp the gown in the front and pull away from the body, breaking the ties in the back (Figure 14). While removing the gown, fold or roll the gown inside-out into a bundle (Figure 15). As gown is being removed, peel off gloves at the same time, **only touching the inside of the gloves and gown with bare hands** (Figure 16). Discard gown and gloves in an appropriate waste container.	Front of gown and sleeves, including waist strings, are contaminated. Hand hygiene prevents transmission of microorganisms. Front of gown and outside of gloves are contaminated. This process contains the outside, contaminated areas of gown.
	Proper disposal prevents transmission of microorganisms. Outside of goggles or face shield is contaminated; do not touch. Hand hygiene prevents transmission of microorganisms. Handling by headband or earpieces and lifting away from face prevents transmission of microorganisms. Proper disposal prevents transmission of microorganisms. Front of mask or respirator is contaminated; do not touch. Not touching the front of the mask and proper disposal of the mask prevent transmission of microorganisms. Hand hygiene prevents spread of microorganisms.

FIGURE 14. Grasping the outside of the front of gown and pulling away from the body.

FIGURE 15. Rolling gown inside-out into a bundle.

FIGURE 16. Peeling off gloves as gown is being removed, touching only the inside of the gloves and gown.

(*continued on page 700*)

Skill 25-2 Using Personal Protective Equipment *(continued)*

ACTION

8. To remove the goggles or face shield: **Outside of goggles or face shield is contaminated—do not touch.** If hands are contaminated during goggle or face shield removal, immediately perform hand hygiene. Grasp the headband or earpieces and remove from the back (Figure 17). Lift away from the face. **Do not touch the front of goggles or face shield.** Place in designated receptacle for reprocessing or in an appropriate waste container.
9. To remove mask or respirator: **Front of mask/respirator is contaminated—do not touch.** If hands are contaminated during mask/respirator removal, immediately perform hand hygiene. Grasp the bottom ties or elastic of the mask/respirator, then top ties or elastic, lift away from face, and remove (Figure 18). **Do not touch the front of mask or respirator.** Discard in an appropriate waste container. If using a reusable respirator, save for future use in the designated area.

FIGURE 17. Removing the goggles or face shield, grasping the headband or earpieces.

FIGURE 18. Removing the mask or respirator, grasping the bottom ties or elastic, and then the top ties or elastic.

10. Perform hand hygiene immediately after removing all PPE.

RATIONALE

DOCUMENTATION

It is not usually necessary to document the use of specific articles of PPE or each application of PPE. However, document the implementation and continuation of specific transmission-based precautions as part of the patient's care.

DEVELOPING CLINICAL REASONING AND CLINICAL JUDGMENT

UNEXPECTED SITUATIONS AND ASSOCIATED INTERVENTIONS

- *You did not realize the need for protective equipment at beginning of task:* Stop task and obtain appropriate protective wear.
- *You are accidentally exposed to blood and body fluids:* Stop task and immediately follow facility protocol for exposure, including reporting the exposure.

SPECIAL CONSIDERATIONS

Community-Based Care Considerations

- *Standard Precautions* are used for all patient care, based on risk assessment, and make use of common-sense practices and PPE to protect health care providers from infection and prevent the spread of infection from person to person (CDC, 2016b).
- Measures related to Respiratory Hygiene/Cough Etiquette should be implemented in community settings for any person with signs of illness including cough, congestion, rhinorrhea, or increased production of respiratory secretions (CDC, 2016b).

Skill 25-3 Preparing a Sterile Field and Adding Items to a Sterile Field

DELEGATION CONSIDERATIONS

Procedures requiring the use of a sterile field and other sterile items are not delegated to assistive personnel (AP). Depending on the state's nurse practice act and the organization's policies and procedures, these procedures may be delegated to licensed practical/vocational nurses (LPN/LVNs). The decision to delegate must be based on careful analysis of the patient's needs and circumstances, as well as the qualifications of the person to whom the task is being delegated. Refer to the Delegation Guidelines in Appendix A.

EQUIPMENT

- Sterile-wrapped drape
- Additional sterile supplies, such as dressings, containers, or solutions, as needed
- PPE, as indicated

IMPLEMENTATION

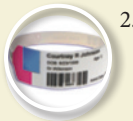
ACTION	RATIONALE
 1. Perform hand hygiene and put on PPE, if indicated.	Hand hygiene and PPE prevent the spread of microorganisms. PPE is required based on transmission precautions.
 2. Identify the patient. Explain the procedure to the patient.	Patient identification validates the correct patient and correct procedure. Discussion and explanation help allay anxiety and prepare the patient for what to expect.
Preparing a Sterile Field	
3. Check that the packaged sterile drape is dry and unopened. Also note expiration date, making sure that the date is still valid.	Moisture contaminates a sterile package. Expiration date indicates period that package remains sterile.
4. Select a work area that is waist level or higher.	Work area is within sight. Bacteria tend to settle, so there is less contamination above the waist.
For a Prepackaged Sterile Drape	
a. Open the outer covering of the drape. Remove sterile drape, lifting it carefully by its corners. Hold away from body and above the waist and work surface.	Outer 1 inch (2.5 cm) of drape is considered contaminated. Any item touching this area is also considered contaminated.
b. Continue to hold only by the corners. Allow the drape to unfold, away from your body and any other surface (Figure 1).	Touching the outer side of the wrapper maintains the sterile field. Contact with any surface would contaminate the field.

FIGURE 1. Holding drape by corners and allowing it to unfold away from body and surfaces.

(*continued on page 702*)

Skill 25-3 Preparing a Sterile Field and Adding Items to a Sterile Field *(continued)*

ACTION	RATIONALE
c. Position the drape on the work surface with the moisture-proof side down (Figure 2). This would be the shiny or blue side. Avoid touching any other surface or object with the drape. If any portion of the drape hangs off the work surface, that part of the drape is considered contaminated.	Moisture-proof side prevents contamination of the field if it becomes wet. The moisture penetrates the sterile cloth or paper and carries organisms by capillary action to contaminate the field. A wet field is considered contaminated if the surface immediately below it is not sterile.
For a Commercially Prepared Kit or Tray	
a. Open the outside cover of the package (Figure 3) and remove the kit or tray. Place in the center of the work surface, with the topmost flap positioned on the far side of the package. Discard outside cover.	This allows sufficient room for sterile field.
b. Reach around the package and grasp the outer surface of the end of the topmost flap, holding no more than 1 inch from the border of the flap. Pull open away from the body, keeping the arm outstretched and away from the inside of the wrapper (Figure 4). Allow the wrapper to lie flat on the work surface.	This maintains sterility of inside of wrapper, which is to become the sterile field. Outer surface of the wrapper is considered unsterile. Outer 1-inch border of the wrapper is considered contaminated.
c. Reach around the package and grasp the outer surface of the first side flap, holding no more than 1 inch from the border of the flap. Pull open to the side of the package, keeping the arm outstretched and away from the inside of the wrapper (Figure 5). Allow the wrapper to lie flat on the work surface.	This maintains sterility of inside of wrapper, which is to become the sterile field. Outer surface of the wrapper is considered unsterile. Outer 1-inch border of the wrapper is considered contaminated.

FIGURE 2. Positioning drape on work surface with the moisture-proof side down.

FIGURE 3. Opening outside cover of package.

FIGURE 4. Pulling top flap open, away from body.

FIGURE 5. Pulling open the first side flap.

ACTION	RATIONALE
d. Reach around the package and grasp the outer surface of the remaining side flap, holding no more than 1 inch from the border of the flap. Pull open to the side of the package, keeping the arm outstretched and away from the inside of the wrapper (Figure 6). Allow the wrapper to lie flat on the work surface.	This maintains sterility of inside of wrapper, which is to become the sterile field. Outer surface of the wrapper is considered unsterile. Outer 1-inch border of the wrapper is considered contaminated.
e. Stand away from the package and work surface. Grasp the outer surface of the remaining flap closest to the body, holding not more than 1 inch from the border of the flap. Pull the flap back toward the body, keeping arm outstretched and away from the inside of the wrapper (Figure 7). Keep this hand in place. Use other hand to grasp the wrapper on the underside (the side that is down to the work surface). Position the wrapper so that when flat, edges are on the work surface, and do not hang down over sides of work surface (Figure 8). Allow the wrapper to lie flat on the work surface.	
f. The outer wrapper of the package has become a sterile field with the packaged supplies in the center (Figure 9). Do not touch or reach over the sterile field. Place additional sterile items on field as needed. Continue with the procedure as indicated.	Sterility of the field and contents are maintained.

FIGURE 6. Pulling open the remaining side flap.

FIGURE 7. Pulling open flap closest to body.

FIGURE 8. Positioning wrapper on work surface.

FIGURE 9. Outside wrapper of package is now sterile field.

(*continued on page 704*)

Skill 25-3 Preparing a Sterile Field and Adding Items to a Sterile Field *(continued)*

ACTION	RATIONALE
Adding Items to a Sterile Field	
5. Place additional sterile items on field as needed.	
To Add a Facility-Wrapped and Sterilized Item	
a. Hold facility-wrapped item in the dominant hand, with top flap opening away from the body. With other hand, reach around the package and unfold top flap and both sides.	Only sterile surface and item are exposed before dropping onto sterile field.
b. Keep a secure hold on the item through the wrapper with the dominant hand. Grasp the remaining flap of the wrapper closest to the body, taking care not to touch the inner surface of the wrapper or the item. Pull the flap back toward the wrist, so the wrapper covers the hand and wrist.	Only sterile surface and item are exposed before dropping onto sterile field.
c. Grasp all the corners of the wrapper together with the nondominant hand and pull back toward wrist, covering hand and wrist. Hold in place.	Only sterile surface and item are exposed before dropping onto sterile field.
d. Hold the item 6 inches above the surface of the sterile field and drop onto the field. **Be careful to avoid touching the surface or other items or dropping any item onto the 1-inch border**.	This prevents contamination of the field and inadvertent dropping of the sterile item too close to the edge or off the field. Any items landing on the 1-inch border are considered contaminated.
To Add a Commercially Wrapped and Sterilized Item	
a. Depending on the type of package, hold package in one hand. Pull back top cover with other hand. Alternatively, carefully peel the edges apart using both hands (Figure 10).	Contents remain uncontaminated by hands.
b. After top cover or edges are partially separated, hold the item 6 inches above the surface of the sterile field. Continue opening the package and drop the item onto the field (Figure 11). **Be careful to avoid touching the surface or other items or dropping an item onto the 1-inch border.**	This prevents contamination of the field and inadvertent dropping of the sterile item too close to the edge or off the field. Any items landing on the 1-inch border are considered contaminated.

FIGURE 10. Carefully peeling edges apart.

FIGURE 11. Dropping sterile item onto sterile field.

c. Discard wrapper.	A neat work area promotes proper technique and avoids inadvertent contamination of the field.
To Add a Sterile Solution	
a. Obtain appropriate solution and check expiration date.	Once opened, label any bottles with date and time. Solution may be kept for use for 24 hours once opened.

ACTION	RATIONALE
b. Open solution container according to directions and **place cap on table away from the field with edges up** (Figure 12).	Sterility of inside cap is maintained.
c. Hold bottle outside the edge of the sterile field with the label side facing the palm of your hand and prepare to pour from a height of 4 to 6 inches (10 to 15 cm). **Do not touch the tip of the bottle to the sterile container or field.**	Label remains dry, and solution may be poured without reaching across sterile field. Minimal splashing occurs from that height. Accidentally touching the tip of the bottle to a container or dressing contaminates them both.
d. Pour required amount of solution steadily into sterile container previously added to the sterile field and positioned at side of sterile field or onto dressings (Figure 13). **Avoid splashing any liquid.**	A steady stream minimizes the risk of splashing; moisture contaminates sterile field.

FIGURE 12. Opening bottle of sterile solution and placing cap on table with edges up.

FIGURE 13. Pouring solution into sterile container.

6. Continue with procedure as indicated.	
 7. When procedure is completed, remove PPE, if used. Perform hand hygiene.	Proper removal of PPE reduces the risk for infection transmission and contamination of other items. Hand hygiene prevents the spread of microorganisms.

DOCUMENTATION

It is not usually necessary to document the addition of sterile items to a sterile field. However, document the use of performing sterile technique for any procedure.

UNEXPECTED SITUATIONS AND ASSOCIATED INTERVENTIONS

- A part of the sterile field becomes contaminated: *When any portion of the sterile field becomes contaminated, discard the sterile field and any items on the field and start over.*
- You realize a supply is missing after setting up the sterile field: *Call for help. Do not leave the sterile field unattended. If you are unable to see the sterile field at all times, it is considered contaminated.*
- The patient touches the sterile field: *If the patient touches the sterile field, discard the supplies and prepare a new sterile field. If the patient is confused, have someone assist by holding the patient's hands and/or reinforcing what is happening.*

Skill 25-4 Putting on Sterile Gloves and Removing Soiled Gloves

DELEGATION CONSIDERATIONS

Procedures requiring the use of sterile gloves and other sterile items are not delegated to assistive personnel (AP). Depending on the state's nurse practice act and the organization's policies and procedures, these procedures may be delegated to licensed practical/vocational nurses (LPN/LVNs). The decision to delegate must be based on careful analysis of the patient's needs and circumstances, as well as the qualifications of the person to whom the task is being delegated. Refer to the Delegation Guidelines in Appendix A.

EQUIPMENT

- Sterile gloves of the appropriate size
- PPE, as indicated

IMPLEMENTATION

ACTION	RATIONALE
 1. Perform hand hygiene and put on PPE, if indicated.	Hand hygiene and PPE prevent the spread of microorganisms. PPE is required based on transmission precautions.
 2. Identify the patient. Explain the procedure to the patient.	Patient identification validates the correct patient and correct procedure. Discussion and explanation help allay anxiety and prepare the patient for what to expect.
3. Check that the sterile glove package is dry and unopened. Also note expiration date, making sure that the date is still valid.	Moisture contaminates a sterile package. Expiration date indicates the period that the package remains sterile.
4. Place sterile glove package on clean, dry surface at or above your waist.	Moisture could contaminate the sterile gloves. Any sterile object held below the waist is considered contaminated.
5. Open the outside wrapper by carefully peeling the top layer back (Figure 1). Remove inner package, handling only the outside of it.	This maintains sterility of gloves in inner packet.
6. Place the inner package on the work surface with the side labeled "cuff end" closest to the body.	Allows for ease of glove application.
7. Carefully open the inner package. Fold open the top flap, then the bottom and sides (Figure 2). **Do not touch the inner surface of the package or the gloves.**	The inner surface of the package is considered sterile. The outer 1-inch border of the inner package is considered contaminated. The sterile gloves are exposed with the cuff end closest to the nurse.

FIGURE 1. Pulling top layer of outside wrapper back.

FIGURE 2. Folding back side flaps.

ACTION	RATIONALE
8. With the thumb and forefinger of the nondominant hand, grasp the folded cuff of the glove for the dominant hand, touching only the exposed inside of the glove (Figure 3).	Unsterile hand touches only inside of glove. Outside remains sterile.
9. Keeping the hands above the waistline, lift and hold the glove up and off the inner package with fingers down (Figure 4). **Do not let it touch any unsterile object.**	Glove is contaminated if it touches any unsterile objects.
10. Carefully insert dominant hand palm up into glove (Figure 5) and pull glove on. Leave the cuff folded until the opposite hand is gloved.	Attempting to turn upward with unsterile hand may result in contamination of sterile glove.
11. Hold the thumb of the gloved hand outward. Place the fingers of the gloved hand inside the cuff of the remaining glove (Figure 6). Lift it from the wrapper, taking care not to touch anything with the gloves or hands.	Thumb is less likely to become contaminated if held outward. Sterile surface touching sterile surface prevents contamination.

FIGURE 3. Grasping cuff of glove for dominant hand.

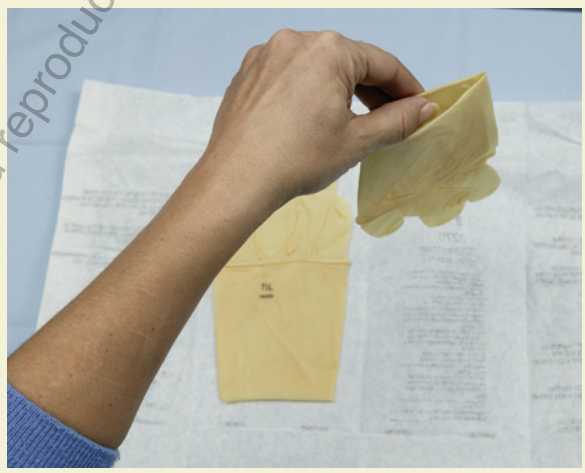


FIGURE 4. Lifting glove from package.

FIGURE 5. Inserting dominant hand into glove.

FIGURE 6. Sliding fingers under cuff of glove for nondominant hand.

(*continued on page 708*)

Skill 25-4 Putting on Sterile Gloves and Removing Soiled Gloves *(continued)*

ACTION	RATIONALE
12. Carefully insert nondominant hand into glove. Pull the glove on, taking care that the skin does not touch any of the outer surfaces of the gloves.	Sterile surface touching sterile surface prevents contamination.
13. Slide the fingers of one hand under the cuff of the other and fully extend the cuff down the arm, **touching only the sterile outside of the glove** (Figure 7). Repeat for the remaining hand.	Sterile surface touching sterile surface prevents contamination.
14. Adjust gloves on both hands, if necessary, **touching only sterile areas with other sterile areas** (Figure 8).	Sterile surface touching sterile surface prevents contamination.

FIGURE 7. Sliding fingers of one hand under cuff of other hand and extending cuff down the arm.

FIGURE 8. Adjusting gloves as necessary.

15. Continue with procedure as indicated.

Removing Soiled Gloves

16. **Outside of gloves is contaminated.** If hands are contaminated during gown or glove removal, immediately perform hand hygiene. Grasp the palm area of one gloved hand with the opposite gloved hand. Remove it by pulling it off, inverting it as it is pulled, keeping the contaminated area on the inside (Figure 9). Hold the removed glove in the remaining gloved hand.	Hand hygiene prevents the spread of microorganisms. Contaminated area does not come in contact with hands or wrists.

FIGURE 9. Inverting glove as it is removed.

ACTION	RATIONALE
17. Slide fingers of ungloved hand between the remaining glove and the wrist (Figure 10). **Take care to avoid touching the outside surface of the glove.** Remove it by pulling second glove over the first glove, inverting it as it is pulled, keeping the contaminated area on the inside, and securing the first glove inside the second (Figure 11).	Contaminated area does not come in contact with hands or wrists.

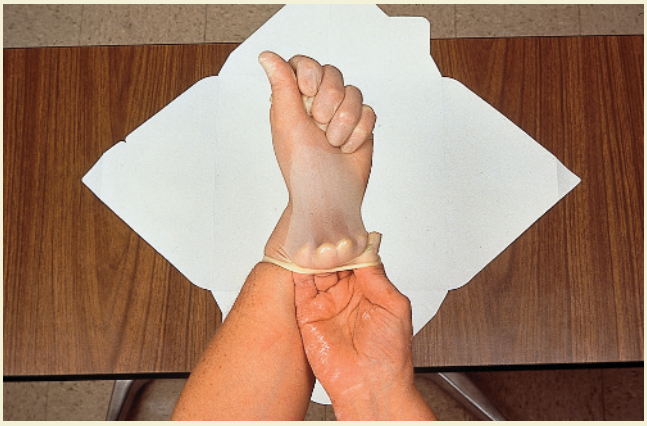


FIGURE 10. Sliding fingers of ungloved hand inside remaining glove.

FIGURE 11. Inverting glove as it is removed, securing first glove inside it.

 18. Discard gloves in appropriate container. Remove additional PPE, if used. Perform hand hygiene.	Proper removal and disposal of PPE reduces the risk for infection transmission and contamination of other items. Hand hygiene prevents the spread of microorganisms.

DOCUMENTATION

It is not usually necessary to document the application of sterile gloves and removal. However, document the use of sterile technique for any procedure performed using sterile technique.

DEVELOPING CLINICAL REASONING AND CLINICAL JUDGMENT

UNEXPECTED SITUATIONS AND ASSOCIATED INTERVENTIONS

- *Contamination occurs during application of the sterile gloves:* Discard gloves and open new package of sterile gloves.
- *A hole or tear is noticed in one of the gloves:* Discard gloves and open a new package of sterile gloves.
- *A hole or tear is noticed in one of the gloves during the procedure:* Stop procedure. Remove damaged gloves. Perform hand hygiene and put on new sterile gloves.
- *The patient touches the nurse's hand:* If the patient touches your hands and nothing else, you may remove the contaminated gloves and put on new sterile gloves. It may be a good idea to bring two pairs of sterile gloves into the room, depending on facility policy, so that you will not have to leave the procedure to get a new pair.
- If the patient touches the sterile field, discard the supplies and prepare a new sterile field. If the patient is confused, have someone assist you by holding the patient's hands or reinforcing what is happening.
- *Patient has a latex allergy:* Obtain latex-free sterile gloves.

DEVELOPING CLINICAL REASONING AND CLINICAL JUDGMENT

1. A nurse cannot help but notice that whenever a particular surgeon makes rounds, he ignores basic principles of asepsis. He moves from one patient to another, touching dressings without washing his hands between patients. He is also inconsistent in his practice of sterile technique. You have anecdotal information that leads you to suspect that there is a higher rate of postoperative infection among his patients. What do you do?
2. A friend who is a nursing student always wears gloves when doing anything for ill patients. You are more selective in your use of gloves. She tells you that you are a fool for "taking chances" because you never know what you may pick up and bring home. Is this a matter of personal preference? What about human touch? Is one position more consistent with good nursing? Are your instructors consistent in how they respond to these questions?

PRACTICING FOR NCLEX

1. A nurse is changing a patient's bed linens after drainage from an infected abdominal wound leaked. Which nursing action reflects proper use of medical asepsis?
   a. Carrying soiled bed linens close to the body to prevent spreading microorganisms into the air
   b. Placing soiled bed linens and hospital gowns on the floor when making the bed
   c. Moving the patient table away from the body when wiping it off
   d. Cleaning the most soiled items at the bedside first, followed by cleaner items
2. An outbreak of measles has occurred at the local elementary school. The parents of a child in the prodromal phase of the illness are told the child should stay home until well. What is important for the nurse to teach the parents about the prodromal phase?
   a. The organisms enter the body and multiply while the patient is asymptomatic.
   b. A person typically has vague, nonspecific symptoms and is highly contagious.
   c. The presence of infection-specific signs and symptoms develop, manifesting as local or systemic responses.
   d. The signs and symptoms of the illness disappear, and the person returns to their preillness state.
3. A nursing unit has multiple patients with MRSA infections requiring contact isolation. In which situations is it appropriate for the nurses to use an alcohol-based hand sanitizer to decontaminate their hands? Select all that apply.
   a. Before providing a bed bath
   b. Having visibly soiled hands after patient contact
   c. Removing gloves after patient care
   d. Inserting a urinary catheter
   e. Assisting with a surgical placement of a cardiac stent
   f. Removing old magazines from a patient's table
4. A nursing student is performing hand hygiene after providing care to a patient who is in isolation for *C. diff* related to antibiotic therapy. Which actions by the nursing student will the primary nurse need to correct? Select all that apply.
   a. Removing all jewelry including a platinum wedding band
   b. Decontaminating the hands with an alcohol-based hand sanitizer
   c. Using approximately 1 teaspoon of liquid soap
   d. Keeping hands higher than elbows when placing under the faucet
   e. Using friction motion when washing for at least 20 seconds
   f. Rinsing thoroughly with water flowing toward the fingertips
5. When performing a dressing change requiring surgical asepsis, a nurse opens sterile supplies and dons sterile gloves. What additional action by the nurse is appropriate?
   a. Avoiding splashing while pouring irrigant onto the sterile field
   b. Covering the nose and mouth with gloved hands if a sneeze is imminent
   c. Using forceps soaked in a disinfectant to place dressings on the sterile field
   d. Considering the outer 1 inch of the sterile field sterile
6. The nurse on a medical-surgical unit is admitting a patient with a diagnosis of active tuberculosis. Which infection control precautions will the nurse put in place?
   a. Wearing sterile gloves for patients with visible body fluids
   b. Placing the patient on airborne precautions
   c. Wearing an N95 respirator mask when in the room
   d. Placing the patient in a single-occupancy room
   e. Ensuring the room provides positive pressure
   f. Restricting visitors for the duration of the patient's stay
7. Nursing students enrolled in a medical-surgical nursing course are learning about infection control measures. They have learned that nurses use droplet precautions for patients with which infections? Select all that apply.
   a. Rubella
   b. Herpes simplex
   c. Varicella
   d. Tuberculosis
   e. MRSA
   f. Adenovirus

8. A nurse and health care provider are preparing for insertion of a central venous catheter when the patient accidentally touches the sterile field. What action will the nurse take next?
   a. Ask another nurse to hold the patient's hand and continue setting up the field
   b. Remove any objects the patient touched and resume setting up the sterile field
   c. Have someone hold the patient's hand, discard the supplies, and prepare a new sterile field
   d. No action since the patient has touched their own sterile field
9. When performing sterile wound irrigation and dressing change for a postoperative patient, a new graduate nurse creates a sterile field. Which actions require correction by the preceptor? Select all that apply.
   a. Placing the bottle cap for the irrigating solution off the sterile field with the edges down
   b. Holding the bottle of irrigating solution inside the edge of the sterile field
   c. Applying the second sterile glove by lifting it from beneath the cuff with the thumb held away from the glove
   d. Pouring the irrigating solution into a sterile container from a height of 4 to 6 inches (10 to 15 cm)
   e. Opening packages of sterile gauze dressings, prior to applying sterile gloves
10. A nurse has finished providing care for a patient in contact isolation for a MRSA infection. Place the steps the nurse should follow to remove PPE in the correct order.
   a. Untie gown at the front waist
   b. Remove mask
   c. Remove gloves
   d. Remove gown
   e. Remove goggles
11. A nurse administering an injection to a patient who tested positive for HIV sustains a needlestick. What action should the nurse take first?
   a. Report the incident to the nurse manager and file an injury report
   b. Wash the exposed area with warm water and soap
   c. Consent to postexposure prophylaxis (PEP) at the appropriate time
   d. Set up counseling sessions regarding safe practice to protect self
12. During morning huddle, a nurse manager and some nurses are identifying patients on the unit who are at risk for hospital-acquired infections (HAIs). Which patients will the nurses identify? Select all that apply.
   a. Smoker, two packs of cigarettes daily
   b. White blood cell count of 2,000/mm^3
   c. Indwelling urinary catheter in place
   d. Vegetarian and slightly underweight
   e. Central venous catheter present
   f. Postoperative colostomy
13. A nurse is caring for a patient who is incontinent of stool and has developed a stage 3 pressure wound on the buttocks. What intervention will the nurse set as the priority of care?
   a. Increasing nutrition
   b. Promoting mobility
   c. Managing chronic pain
   d. Preventing infection
14. A home health nurse teaches a patient to a change the dressing for a chronic venous stasis ulcer using clean technique. Which principle of asepsis will the nurse consider when preparing the teaching plan?
   a. The nurse chooses clean or sterile technique based on personal preference.
   b. The use of clean technique is considered safe in the home setting.
   c. Surgical asepsis is the safest method to use in a home setting.
   d. The patient can use clean technique; their partner must wear sterile gloves.
15. When bathing a patient with *C. diff* infection, the nurse wears personal protective equipment (PPE). Which additional intervention promotes safe, effective care?
   a. Donning PPE after entering the patient room
   b. Bathing the perianal area last
   c. Personalizing care by substituting glasses for goggles
   d. Removing PPE after bathing the patient to talk with them in the room
16. A nurse is preparing to admit a patient with urinary sepsis related to vancomycin-resistant enterococci (VRE). While awaiting the patient's arrival, which of these actions will the nurse take?
   a. Prepare a negative-pressure room
   b. Ask the AP to get a supply of protective gowns
   c. Post a sign that visitors must wear a mask
   d. Obtain sterile gloves for personal care

ANSWERS WITH RATIONALES

1. **c.** According to the principles of medical asepsis, the nurse should move equipment and soiled items away from the body to prevent contaminated particles from settling on the hair, face, or uniform. The nurse should not put soiled items on the floor, as it is highly contaminated. The nurse should also clean the least soiled areas first, then move to the more soiled ones to prevent contamination.
2. **b.** During the prodromal stage, the person has vague signs and symptoms, such as fatigue and a low-grade fever. There are no obvious symptoms of infection during the incubation period, and symptoms are more specific and apparent during the full stage of illness, disappearing in the convalescent period.
3. **a, c, d, f.** An alcohol-based handrub is used in the following situations: before direct contact with patients; after direct contact with patient skin; after contact with body fluids *if hands are not visibly soiled;* after removing gloves; before

inserting urinary catheters, peripheral vascular catheters, or invasive devices *not requiring surgical placement;* before donning sterile gloves prior to an invasive procedure; when moving from a contaminated body site to a clean body site; and after contact with objects contaminated by the patient. It is essential to note that handrubs are not appropriate for use after caring for a patient with *C. diff* infection.

4. **b, d.** After caring for patients with *C. diff* infection, proper handwashing includes using soap and water, then rinsing thoroughly with water flowing toward fingertips. Proper hand hygiene permits a plain wedding band to be worn; other jewelry is removed. The nurse uses about 1 teaspoon (5 mL) of liquid soap, using friction motion for at least 20 seconds, washing to 1 inch above the wrists using friction.

5. **d.** Considering the outer inch of a sterile field as contaminated is a principle of surgical asepsis. Moisture, such as from splashes contaminates the sterile field, and sneezing would contaminate the sterile gloves. Forceps soaked in disinfectant are not considered sterile.

6. **b, c, d.** Airborne precautions are used for patients who have infections with small particles that spread through the air, for example, tuberculosis, varicella, and rubeola. An N95 respirator mask is worn and the patient placed in a private room, preferably with negative air pressure. Sterile gloves are used for procedures requiring surgical asepsis. Standard precautions are for all patient care when contact with blood or body fluids, nonintact skin, and mucous membranes are likely. Visitors must wear PPE, including a mask.

7. **a, b, f.** Rubella, diphtheria, and adenovirus infection are illnesses transmitted by large-droplet particles; droplet precautions and standard precautions are indicated. Airborne precautions refer to small, infectious particles spread through the air; for example, tuberculosis, varicella, and rubeola. Contact precautions are used for patients who are infected or colonized by a multidrug-resistant organism (MDRO), such as MRSA.

8. **c.** If a patient touches a sterile field, the nurse should discard all supplies and prepare a new sterile field. If the patient is restless or confused, the nurse obtains an assistant to hold the patient's hands and explain what is happening.

9. **d, e.** To add a sterile solution to a sterile field, the nurse opens the solution container according to directions and places the cap on the table away from the field with the edges up. The nurse then holds the bottle outside the edge of the sterile field with the label side facing the palm of the hand and pours from a height of 4 to 6 inches (10 to 15 cm) to prevent splashing.

10. **a, c, e, d, b.** If an impervious gown has been tied in front of the body at the waist, the nurse should untie the waist strings before removing gloves. Gloves are removed first because they are most likely to be contaminated, followed by the goggles, gown, and mask. Hands should be washed thoroughly after the equipment has been removed and before leaving the room.

11. **b.** When a needlestick injury occurs, the nurse should wash the affected area immediately with warm water and soap, report the incident to the nurse manager or appropriate person and complete an injury report, consent to and await the results of blood tests, consent to PEP, and attend counseling sessions regarding safe practice to protect self and others.

12. **b, c, e, f.** Leukopenia (low white blood cell count), indwelling urinary catheters, central venous catheters, and surgeries in which the wound is classified as dirty have been implicated in most HAIs. Cigarette smoking and a vegetarian diet have not been implicated as risk factors for HAIs.

13. **d.** The priority in this situation is to prevent infection through contamination of the wound by stool. The other actions may be taken as needed, after infection prevention is addressed.

14. **b.** Medical asepsis, or clean technique, involves procedures and practices that reduce the number and transfer of pathogens. This is usually recommended in the home setting, where the patient's environment is more controlled. Injections require surgical asepsis. The patient and partner share the same home; medical asepsis is appropriate.

15. **b.** When using PPE, the nurse should work from clean areas to soiled ones, don PPE before entering the patient room, always use goggles instead of personal glasses, and remove PPE in the doorway or anteroom just before exiting.

16. **b.** VRE is spread via contact with the feces, urine, or blood of an infected or colonized person. Contact precautions, meticulous hand hygiene, reducing the use of invasive devices, environmental cleaning, and decolonizing high-risk patients are indicated. Some institutions have discontinued using contact precautions and use standard precautions, with no significant change in the incidence of MRSA or VRE.

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