misperceptions can be clarified. This framework includes the following categories:

- **Nutritional-Metabolic:** Food and fluid consumption relative to metabolic need
- **Elimination:** Excretion including bowel and bladder
- **Activity-Exercise:** Activity and exercise
- **Sleep-Rest:** Sleep and rest
- **Cognitive-Perceptual:** Cognition and perception
- **Role-Relationship:** Roles and relationships
- **Sexuality-Reproductive:** Sexuality and reproduction
- **Coping-Stress Tolerance:** Coping and effectiveness of managing stress
- **Value-Belief:** Values, beliefs, and goals that guide choices and decisions
- **Self-Perception and Self-Concept:** Self-concept and mood state[4]
- **Health Perception-Health Management:** A patient's perception of their health and well-being and how it is managed. This is an umbrella category of all the categories above and underlies performing a health history.

The functional health section can be started by saying, "I would like to ask you some questions about factors that affect your ability to function in your day-to-day life. Feel free to share any health concerns that come to mind during this discussion." Focused interview questions for each category are included in Table 2.8. Each category is further described below.

Nutrition

The nutritional category includes, but is not limited to, food and fluid

4. Gordon, M. (2008). *Assess notes nursing: Nursing assessment and diagnostic reasoning for clinical practice.* F.A. Davis Company.

intake, usual diet, financial ability to purchase food, time and knowledge to prepare meals, and appetite. This is also an opportune time to engage in health promotion discussions about healthy eating. Be aware of signs for malnutrition and obesity, especially if rapid and excessive weight loss or weight gain have occurred.

Life Span Considerations

When assessing nutritional status, the types of questions asked and the level of detail depend on the developmental age and health of the patient. Family members may also provide important information.

- **Infants:** Ask parents about using breast milk or formula, amount, frequency, supplements, problems, and introductions of new foods.
- **Pregnant women:** Include questions about the presence of nausea and vomiting and intake of folic acid, iron, omega-3 fatty acids, vitamin D, and calcium.
- **Older adults or patients with disabling illnesses:** Inquire about the ability to purchase and cook their food, decreased sense of taste, ability to chew or swallow foods, loss of appetite, and enough fiber and nutrients.[5]

> For more information about nutrition, visit the "Nutrition" chapter in Open RN *Nursing Fundamentals*.

Elimination

Elimination refers to the removal of waste products through the urine and stool. Health care professionals refer to urinating as **voiding** and stool

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elimination as having a bowel movement. Familiar terminology may need to be used with patients, such as “pee” and “poop.”

Constipation commonly occurs in hospitalized patients, so it is important to assess the date of their last bowel movement and monitor the frequency, color, and consistency of their stool.

Assess urine concentration, frequency, and odor, especially if concerned about urinary tract infection or incontinence. Findings that require further investigation include **dysuria** (pain or difficulty upon urination), blood in the stool, **melena** (black, tarry stool), constipation, diarrhea, or excessive laxative use.[6]

Life Span Considerations

When assessing elimination, the types of questions asked and the level of detail depends on the developmental age and health of the patient.

Toddlers: Ask parents or guardians about toilet training. Toilet training takes several months, occurs in several stages, and varies from child to child. It is influenced by culture and depends on physical and emotional readiness, but most children are toilet trained between 18 months and three years.

Older Adults: Constipation and incontinence are common symptoms associated with aging. Additional focused questions may be required to further assess these issues.[7]

> For more information about elimination, visit the “Elimination” chapter in Open RN *Nursing*

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Fundamentals.

Mobility, Activity, and Exercise

Mobility refers to a patient's ability to move around (e.g., sit up, sit down, stand up, walk). Activity and exercise refer to informal and/or formal activity (e.g., walking, swimming, yoga, strength training). In addition to assessing the amount of exercise, it is also important to assess activity because some people may not engage in exercise but have an active lifestyle (e.g., walk to school or work in a physically demanding job).

Findings that require further investigation include insufficient aerobic exercise and identified risks for falls.[8]

Life Span Considerations

Mobility and activity depend on developmental age and a patient's health and illness status. With infants, it is important to assess their ability to meet specific developmental milestones at each well-baby visit. Mobility can become problematic for patients who are ill or are aging and can result in self-care deficits. Thus, it is important to assess how a patient's mobility is affecting their ability to perform ADLs and IADLs.[9]

- For more information, visit the "Mobility" chapter in Open RN *Nursing Fundamentals*.

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Sleep and Rest

The sleep and rest category refers to a patient's pattern of rest and sleep and any associated routines or sleeping medications used. Although it varies for different people and their life circumstances, obtaining eight hours of sleep every night is a general guideline. Findings that require further investigation include disruptive sleep patterns and reliance on sleeping pills or other sedative medications.[10]

Life Span Considerations

Older Adults: Disruption in sleep patterns can be especially troublesome for older adults. Assessing sleep patterns and routines will contribute to collaborative interventions for improved rest.[11]

> For more information, visit the "Sleep and Rest" chapter in Open RN *Nursing Fundamentals*.

Cognitive and Perceptual

The cognitive and perceptual category focuses on a person's ability to collect information from the environment and use it in reasoning and other thought processes. This category includes the following:

- Adequacy of vision, hearing, taste, touch, feeling, and smell
- Any assistive devices used
- Pain level and pain management
- Cognitive functional abilities, such as orientation, memory, reasoning, judgment, and decision-making[12]

10. This work is a derivative of The Complete Subjective Health Assessment by Lapum, St-Amant, Hughes, Petrie, Morrell, and Mistry licensed under CC BY-SA 4.0
11. This work is a derivative of The Complete Subjective Health Assessment by Lapum, St-Amant, Hughes, Petrie, Morrell, and Mistry licensed under CC BY-SA 4.0
12. Gordon, M. (2008). *Assess notes nursing: Nursing assessment and diagnostic reasoning for clinical*

If a patient is experiencing pain, it is important to perform an in-depth assessment using the PQRSTU method described in the "Reason for Seeking Health Care" section of this chapter. It is also helpful to use evidence-based assessment tools when assessing pain, especially for patients who are unable to verbally describe the severity of their pain. See Figure 2.4[13] for an image of the Wong-Baker FACES tool that is commonly used in health care.

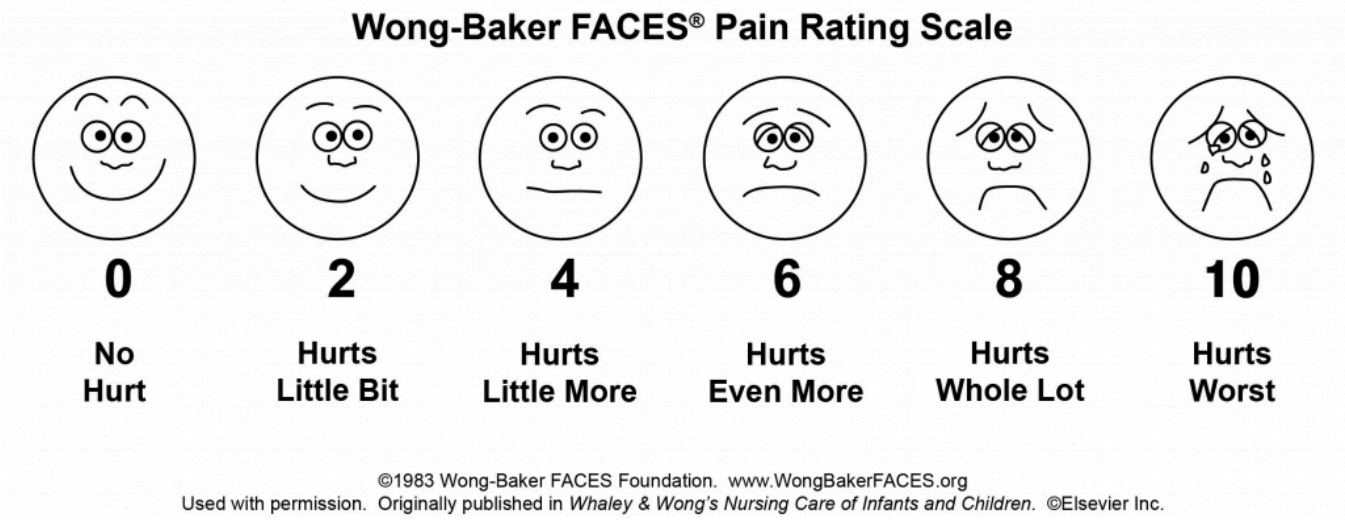

Figure 2.4 The Wong-Baker FACES Pain Rating Scale. Used with permission from http://www.WongBakerFACES.org.

Life Span Considerations

Older Adults: Older adults are especially at risk for problems in the cognitive and perceptual category. Be alert for cues that suggest deficits are occurring that have not been previously diagnosed.

Roles – Relationships

Quality of life is greatly influenced by the roles and relationships established with family, friends, and the broader community. Roles often define our identity. For example, a patient may describe themselves as a "mother of an 8-year-old." This category focuses on roles and relationships

practice. F.A. Davis Company.

13. Wong-Baker FACES Foundation. (2020). Wong-Baker FACES® Pain Rating Scale.

that may be influenced by health-related factors or may offer support during illness.[14] Findings that require further investigation include indications that a patient does not have any meaningful relationships or has "negative" or abusive relationships in their lives.

Life Span Considerations

Be sensitive to cues when assessing individuals with any of the following characteristics: isolation from family and friends during crisis, language barriers, loss of a significant person or pet, loss of job, significant home care needs, prolonged caregiving, history of abuse, history of substance abuse, or homelessness.[15]

Sexuality – Reproduction

Sexuality and sexual relations are an aspect of health that can be affected by illness, aging, and medication. This category includes a person's gender identity and **sexual orientation**, as well as reproductive issues. It involves a combination of emotional connection, physical companionship (holding hands, hugging, kissing) and sexual activity that impact one's feeling of health.[16]

The Joint Commission has defined terms to use when caring for diverse patients. **Gender identity** is a person's basic sense of being male, female, or other gender.[17] **Gender expression** are characteristics in appearance,

14. Gordon, M. (2008). *Assess notes nursing: Nursing assessment and diagnostic reasoning for clinical practice.* F. A. Davis Company.
15. Gordon, M. (2008). *Assess notes nursing: Nursing assessment and diagnostic reasoning for clinical practice.* F. A. Davis Company.
16. This work is a derivative of The Complete Subjective Health Assessment by Lapum, St-Amant, Hughes, Petrie, Morrell, and Mistry licensed under CC BY-SA 4.0
17. The Joint Commission. (2011). *Advancing effective communication, cultural competence, and patient- and family-centered care for the lesbian, gay, bisexual, and transgender (LGBT) community: A field guide*. https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/health-

personality, and behavior that are culturally defined as masculine or feminine.[18] **Sexual orientation** is the preferred term used when referring to an individual's physical and/or emotional attraction to the same and/or opposite gender.[19] **LGBTQ** is an acronym standing for the lesbian, gay, bisexual, transgender, and queer population. It is an umbrella term that generally refers to a group of people who are diverse in gender identity and sexual orientation. It is important to provide a safe environment to discuss health issues because the LGBTQ population experiences higher rates of smoking, alcohol use, substance abuse, HIV and other STD infections, anxiety, depression, suicidal ideation and attempts, and eating disorders as a result of stigma and marginalization.[20]

Life Span Considerations

Although sexuality is frequently portrayed in the media, individuals often consider these topics as private subjects. Use sensitivity when discussing these topics with different age groups across cultural beliefs while maintaining professional boundaries.

equity/lgbtfieldguide_web_linked_verpdf.pdf downloaded from https://www.jointcommission.org/resources/patient-safety-topics/health-equity/#t=_Tab_StandardsFAQs&sort=relevancy

18. The Joint Commission. (2011). *Advancing effective communication, cultural competence, and patient- and family-centered care for the lesbian, gay, bisexual, and transgender (LGBT) community: A field guide*. https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/health-equity/lgbtfieldguide_web_linked_verpdf.pdf downloaded from https://www.jointcommission.org/resources/patient-safety-topics/health-equity/#t=_Tab_StandardsFAQs&sort=relevancy
19. The Joint Commission. (2011). *Advancing effective communication, cultural competence, and patient- and family-centered care for the lesbian, gay, bisexual, and transgender (LGBT) community: A field guide*. https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/health-equity/lgbtfieldguide_web_linked_verpdf.pdf downloaded from https://www.jointcommission.org/resources/patient-safety-topics/health-equity/#t=_Tab_StandardsFAQs&sort=relevancy
20. The Joint Commission. (2011). *Advancing effective communication, cultural competence, and patient- and family-centered care for the lesbian, gay, bisexual, and transgender (LGBT) community: A field guide*. https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/health-equity/lgbtfieldguide_web_linked_verpdf.pdf downloaded from https://www.jointcommission.org/resources/patient-safety-topics/health-equity/#t=_Tab_StandardsFAQs&sort=relevancy

For more information, read the Joint Commission's PDF Field Guide called Advancing Effective Communication, Cultural Competence, and Patient- and Family-Centered Care for the Lesbian, Gay, Bisexual, and Transgender (LGBT) Community.

Coping-Stress Tolerance

Individuals experience stress that can lead to dysfunction if not managed in a healthy manner. Throughout life, healthy and unhealthy coping strategies are learned. Coping strategies are behaviors used to manage anxiety. Effective strategies control anxiety and lead to problem-solving but ineffective strategies can lead to abuse of food, tobacco, alcohol, or drugs.[21] Nurses teach and reinforce effective coping strategies.

Substance Use and Abuse

Alcohol, tobacco products, marijuana, and drugs are often used as ineffective coping strategies. It is important to use a nonjudgmental approach when assessing a patient's use of substances, so they do not feel stigmatized. Substance abuse can affect people of all ages. Make a distinction between use and abuse as you assess frequency of use and patterns of behavior. Substance abuse often causes disruption in everyday function (e.g., loss of employment, deterioration of relationships, or precarious living circumstances) because of dependence on a substance. Action is needed if patients indicate that they have a problem with substance use or show signs of dependence, addiction, or binge drinking.[22]

21. Gordon, M. (2008). *Assess notes nursing: Nursing assessment and diagnostic reasoning for clinical practice.* F. A. Davis Company.
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Life Span Considerations

Some individuals are at increased risk for problems with coping strategies and stress management. Be sensitive to cues when assessing individuals with characteristics such as uncertainty in medical diagnosis or prognosis, financial problems, marital problems, poor job fit, or few close friends and family members.[23]

Value-Belief

This category includes values and beliefs that guide decisions about health care and can also provide strength and comfort to individuals. It is common for a person's spirituality and values to be influenced by religious faith. A **value** is an accepted principle or standard of an individual or group. A **belief** is something accepted as true with a sense of certainty. **Spirituality** is a way of living that comes from a set of values and beliefs that are important to a person. The Joint Commission asks health care professionals to respect patients' cultural and personal values, beliefs, and preferences and accommodate patients' rights to religious and other spiritual services.[24] When performing an assessment, use open-ended questions to allow the patient to share values and beliefs they believe are important. For example, ask, "I am interested in your spiritual and religious beliefs and how they relate to your health. Can you share with me any spiritual beliefs or religious practices that are important to you during your stay?"

> For more information about assessing and providing for patients' spiritual needs, visit the "Spirituality" chapter in Open RN *Nursing Fundamentals*.

23. Gordon, M. (2008). *Assess notes nursing: Nursing assessment and diagnostic reasoning for clinical practice.* F. A. Davis Company.
24. The Joint Commission. (2018). *The source, 16*(1). https://store.jcrinc.com/assets/1/14/ts_16_2018_01.pdf

Self-Perception and Self-Concept

The focus of this category is on the subjective thoughts, feelings, and attitudes of a patient about themself. **Self-concept** refers to all the knowledge a person has about themself that makes up who they are (i.e., their identity). **Self-esteem** refers to a person's self-evaluation of these items as being worthy or unworthy. **Body image** is a mental picture of one's body related to appearance and function. It is best to assess these items toward the end of the interview because you will have already collected data that contributes to an understanding of the patient's self-concept. Factors that influence a patient's self-concept vary from person to person and include elements of life they value, such as talents, education, accomplishments, family, friends, career, financial status, spirituality, and religion.[25] The self-perception and self-concept category also focuses on feelings and mood states such as happiness, anxiety, hope, power, anger, fear, depression, and control.[26]

Life Span Considerations

Some individuals are at risk for problems with self-perception and self-concept. Be sensitive to cues when assessing individuals with characteristics such as uncertainty regarding a medical diagnosis or surgery, significant personal loss, history of abuse or neglect, loss of body part or function, or history of substance abuse.[27]

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26. Gordon, M. (2008). *Assess notes nursing: Nursing assessment and diagnostic reasoning for clinical practice.* F. A. Davis Company.
27. Gordon, M. (2008). *Assess notes nursing: Nursing assessment and diagnostic reasoning for clinical practice.* F. A. Davis Company.

Violence and Trauma

There are many types of violence that a person may experience, including neglect or physical, emotional, mental, sexual, or financial abuse. You are legally mandated to report suspected cases of child abuse or neglect, as well as suspected cases of elder abuse. At any time, if you or the patient is in immediate danger, follow agency policy and procedure.

Trauma results from violence or other distressing events in a life. Collaborative intervention with the patient is required when violence and trauma are identified. People respond in different ways to trauma. It is important to use a trauma-informed approach when caring for patients who have experienced trauma. For example, a patient may respond to the traumatic situation in a way that seems unfitting (such as with laughter, ambivalence, or denial). This does not mean the patient is lying but can be a symptom of trauma. To reduce the effects of trauma, it is important to implement collaborative interventions to support patients who have experienced trauma.[28]

Loss of Body Part

A person can have negative feelings or perceptions about the characteristics, function, or limits of a body part as a result of a medical condition, surgery, trauma, or mental condition. Pay attention to cues, such as neglect of a body part or negative comments about a body part and use open-ended questions to obtain additional information.

Mental Health

Mental health is frequently underscreened and unaddressed in health

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care. The mental health of all patients should be assessed, even if they appear well or state they have no mental health concerns so that any changes in condition are quickly noticed and treatment implemented. Mental health includes emotional and psychological symptoms that can affect a patient's day-to-day ability to function. The World Health Organization (2014) defines **mental health** as "a state of well-being in which every individual realizes their own potential, can cope with normal stresses of life, can work productively and fruitfully, and is able to make a contribution to their community."[29] Mental illness includes conditions diagnosed by a health care provider, such as depression, anxiety, addiction, schizophrenia, post-traumatic stress disorder, and others. Mental illness can disrupt everyday functioning and affect a person's employment, education, and relationships.

It is helpful to begin this component of a mental health assessment with a statement such as, "Mental health is an important part of our lives, so I ask all patients about their mental health and any concerns or questions they may have."[30] Be attentive of critical findings that require intervention. For example, if a patient talks about feeling hopeless or depressed, it is important to screen for suicidal thinking. Begin with an open-ended question, such as, "Have you ever felt like hurting yourself?" If the patient responds with a "Yes," then progress with specific questions that assess the immediacy and the intensity of the feelings. For example, you may say, "Tell me more about that feeling. Have you been thinking about hurting yourself today? Have you put together a plan to hurt yourself?" When assessing for suicidal thinking, be aware that a patient most at risk is someone who has a specific plan about self-harm and can specify how and when they will do it. They are particularly at risk if planning self-harm within the next 48 hours. The age of the patient is not a factor in this

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determination of risk. If you believe the patient is at high risk, do not leave the patient alone. Collaborate with them regarding an immediate plan for emergency care.[31]

Health Perception-Health Management

Health perception-health management is an umbrella term encompassing all of the categories described above, as well as environmental health.

Environmental Health

Environmental health refers to the safety of a patient's physical environment, also called a social determinant of health. Examples of environmental health include, but are not limited to, exposure to violence in the home or community; air pollution; and availability of grocery stores, health care providers, and public transportation. Findings that require further investigation include a patient living in unsafe environments.[32]

See Table 2.8 for sample focused questions for all categories related to functional health.[33]

Table 2.8 Focused Interview Questions for Functional Health Categories[34]

Begin this section by saying, "I would like to ask you some questions about factors that affect your ability to function in your day-to-day life.

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Feel free to share any health concerns that come to mind during this discussion."

Category	Focused Questions
Nutrition	Tell me about your diet. What foods do you usually eat? What fluids do you usually drink every day? What have you eaten in the last 24 hours? Is this typical of your usual eating pattern? Tell me about your appetite. Have you had any changes in your appetite? Do you have any goals related to your nutrition? Do you have any financial concerns about purchasing food? Are you able to prepare the meals you want to eat?
Elimination	When was your last bowel movement? Do you have any problems with constipation, diarrhea, or incontinence? Do you take laxatives or stool softeners? Do you have any problems urinating, such as frequent urination or burning on urination? Do you ever experience leaking or dribbling of urine?
Mobility, Activity, and Exercise	Tell me about your ability to move around. Do you have any problems sitting up, standing up, or walking? Do you use any mobility aids (e.g., cane, walker, wheelchair)? Tell me about the activity and/or exercise in which you engage. What type? How frequent? For how long?

Sleep and Rest	Tell me about your sleep routine. How many hours of sleep do you usually get? Do you feel rested when you awaken? Do you do anything to wind down before you go to bed (e.g., watch TV, read)? Do you take any sleeping medication? Do you take any naps during the day?
Cognitive and Perceptual	Are you having any pain? Note: If present, use the PQRSTU method to further assess pain. Are you having any issues with seeing, hearing, smelling, tasting, or feeling things? Have you noticed any changes in memory or problems concentrating? Have you noticed any changes in the ability to make decisions? What is the easiest way for you to learn (e.g., written materials, explanations, or learning-by-doing)?

Roles and Relationships	Tell me about the most influential relationships in your life with family and friends. How do these relationships influence your day-to-day life, health, and illness? Who are the people with whom you talk to when you require support or are struggling in your life? Do you have family or others dependent on you? Have you had any recent losses of someone important to you, a pet, or a job? Do you feel safe in your current relationship?
Sexuality-Reproduction	The expression of love and caring in a sexual relationship and creation of family are often important aspects in a person's life. Do you have any concerns about your sexual health? Tell me about the ways that you ensure your safety when engaging in intimate and sexual practices.
Coping-Stress	Tell me about the stress in your life. Have you experienced a recent loss in your life that has impacted you? How do you cope with stress?
Values-Belief	I am interested in your spiritual and religious beliefs and how they relate to your health. Can you share with me any spiritual beliefs or religious practices that are important to you?

Self-Perception and Self-Concept	Tell me what makes you who you are. How would you describe yourself? Have you noticed any changes in how you view your body or the things you can do? Are these a problem for you? Have you found yourself feeling sad, angry, fearful, or anxious? What helps you to feel better when this happens? Have you ever used any tobacco products (e.g., cigarettes, pipes, vaporizers, hookah)? If so, how much? How much alcohol do you drink every week? Have you used cannabis products? If so, how often do you use them? Have you ever used drugs or prescription drugs that were not prescribed for you? If so, what type? Have you ever felt you had a problem with any of these substances because they affected your daily life? If so, tell me more. Do you want to quit any of these substances? Many patients have experienced violence or trauma in their lives. Have you experienced any violence or trauma in your life? How has it affected you? Would you like to talk with someone about it?

Health Perception – Health Management	Tell me about how you take care of yourself and manage your home. Have you had any falls in the past six months? Do you have enough finances to pay your bills and purchase food, medications, and other needed items? Do you have any current or future concerns about being able to function independently? Tell me about where you live. Do you have any concerns about safety in your home or neighborhood? Tell me about any factors in your environment that may affect your health. Do you have any concerns about how your environment is affecting your health?

2.9 Review of Body Systems

A body system review asks focused questions related to overall health status and body systems such as cardiac, respiratory, neurological, gastrointestinal, urinary, and musculoskeletal systems. See "Chapter Resources A" for a sample health history form that contains brief questions according to body systems. Nurses often incorporate review of system questions into the physical examination of each system. For example, while listening to bowel sounds in the abdomen, a nurse often inquires about the patient's bowel pattern. Additional focused assessment questions related to each body system are found in each assessment chapter of this book.

2.10 Sample Documentation

Information obtained during a health history interview is typically documented on agency-specific forms. See “Chapter Resources A” for a sample health history form used for documentation purposes. Additional information collected that is not included on the form should be documented in an associated progress note.

2.11 Checklist for Obtaining a Health History

Use the checklist below to review the steps for completion of “Obtaining a Health History.”

Steps

Disclaimer: Always review and follow agency policy regarding this specific skill.

1. Gather supplies: health history agency form.
2. Knock, enter the room, greet the patient, and provide for privacy.
3. Perform safety steps:

    - Perform hand hygiene.
    - Check the room for transmission-based precautions.
    - Introduce yourself, your role, the purpose of your visit, and an estimate of the time it will take.
    - Confirm patient ID using two patient identifiers (e.g., name and date of birth).
    - Explain the process to the patient and ask if they have any questions.
    - Be organized and systematic.
    - Use appropriate listening and questioning skills.
    - Listen and attend to patient cues.
    - Ensure the patient’s privacy and dignity.
    - Assess ABCs.

4. Address patient needs (pain, toileting, glasses/hearing aids) prior to starting. Note if the patient has signs of distress such as difficulty breathing or chest pain. If signs are present, defer the health history and obtain emergency assistance per agency policy.
5. Complete a health history interview, including the following components per your instructor’s instructions:

- Demographic and Biological Data
- Reason for Seeking Health Care
- Current and Past Medical History
- Family History
- Functional Health
- Review of Body Systems

6. Ensure safety measures when leaving the room:

    - CALL LIGHT: Within reach
    - BED: Low and locked (in lowest position and brakes on)
    - SIDE RAILS: Secured
    - TABLE: Within reach
    - ROOM: Risk-free for falls (scan room and clear any obstacles)

7. Document the health history findings and report any concerns according to agency policy.

2.12 Learning Activities

Learning Activities

(Answers to "Learning Activities" can be found in the "Answer Key" at the end of the book. Answers to interactive activity elements will be provided within the element as immediate feedback.)

You are admitting a patient with a new diagnosis of type 2 diabetes. During the admission assessment, you note that the patient identifies as Muslim. **How could you explore the patient's cultural background to better understand how the patient's culture might influence the patient's health status and decisions?**

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://wtcs.pressbooks.pub/nursingskills/?p=1101#h5p-117

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://wtcs.pressbooks.pub/nursingskills/?p=1101#h5p-25

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://wtcs.pressbooks.pub/nursingskills/?p=1101#h5p-93

NEXT GEN RN

- Test your clinical judgment with an NCLEX Next Generation-style question: Chapter 2, Assignment 1.

II Glossary

Activities of daily living: Daily basic tasks fundamental to everyday functioning (e.g., hygiene, elimination, dressing, eating, ambulating/moving).

Belief: Something accepted as true with a sense of certainty.[1]

Body image: A mental picture of one's body related to appearance and function.[2]

Care partners: Family and friends who are involved in helping to care for the patient.

Chief complaint: The reason a patient is seeking health care during a visit to a clinic or on admission to a health care facility.

Cultural safety: The creation of safe spaces for patients to interact with health professionals without judgment or discrimination.

Dysuria: Discomfort or pain on urinating.

Elimination: Refers to the removal of waste products through the urine and stool.

Functional health: The patient's physical and mental capacity to participate in activities of daily living (ADLs) and instrumental activities of daily living (IADLs).

Gender expression: Characteristics in appearance, personality, and behavior, culturally defined as masculine or feminine.[3]

1. Gordon, M. (2008). *Assess notes nursing: Nursing assessment and diagnostic reasoning for clinical practice.* F. A. Davis Company.
2. Gordon, M. (2008). *Assess notes nursing: Nursing assessment and diagnostic reasoning for clinical practice.* F. A. Davis Company.
3. The Joint Commission. (2011). *Advancing effective communication, cultural competence, and patient- and family-centered care for the lesbian, gay, bisexual, and transgender (LGBT) community: A field*

Gender identity: One's basic sense of being male, female, or other gender.[4]

Health history: The process of using directed interview questions to obtain symptoms and perceptions about a patient's illness or life condition. The purpose of obtaining a health history is to gather subjective data from the patient and/or the patient's family so that the health care team and the patient can collaboratively create a plan that will promote health, address acute health problems, and minimize chronic health conditions.

Instrumental activities of daily living: Complex daily tasks that allow patients to function independently such as managing finances, paying bills, purchasing and preparing meals, managing one's household, taking medications, and facilitating transportation.

LGBTQ: An acronym standing for lesbian, gay, bisexual, transgender, and queer is an umbrella term that generally refers to a group of people who are diverse with regard to their gender identity and sexual orientation. There are expanded versions of this acronym.[5]

Main health care needs: Term used to classify what needs the patient feels are most important to address after admission to a health care agency.

guide. https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/health-equity/lgbtfieldguide_web_linked_verpdf.pdf downloaded from https://www.jointcommission.org/resources/patient-safety-topics/health-equity/#t=_Tab_StandardsFAQs&sort=relevancy

4. The Joint Commission. (2011). A*dvancing effective communication, cultural competence, and patient- and family-centered care for the lesbian, gay, bisexual, and transgender (LGBT) community: A field guide*. https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/health-equity/lgbtfieldguide_web_linked_verpdf.pdf downloaded from https://www.jointcommission.org/resources/patient-safety-topics/health-equity/#t=_Tab_StandardsFAQs&sort=relevancy
5. The Joint Commission. (2011). *Advancing effective communication, cultural competence, and patient- and family-centered care for the lesbian, gay, bisexual, and transgender (LGBT) community: A field guide*. https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/health-equity/lgbtfieldguide_web_linked_verpdf.pdf downloaded from https://www.jointcommission.org/resources/patient-safety-topics/health-equity/#t=_Tab_StandardsFAQs&sort=relevancy

Medication reconciliation: A comparison of a list of current medications with a previous list and is completed at every hospitalization and clinic visit.

Melena: Dark, tarry-looking stool due to the presence of digested blood.

Mental health: A state of well-being in which every individual realizes their own potential, can cope with normal stresses of life, can work productively and fruitfully, and is able to make a contribution to their community.[6]

Mobility: A patient's ability to move around (e.g., sit up, sit down, stand up, walk).

Nursing: Nursing integrates the art and science of caring and focuses on the protection, promotion, and optimization of health and human functioning; prevention of illness and injury; facilitation of healing; and alleviation of suffering through compassionate presence. Nursing is the diagnosis and treatment of human responses and advocacy in the care of individuals, families, groups, communities, and populations in recognition of the connection of all humanity.[7]

Objective data: Information observed through your sense of hearing, sight, smell, and touch while assessing the patient.

Primary source of data: Information obtained directly from the patient.

Secondary source of data: Information from the patient's chart, family members, or other health care team members.

Self-concept: Knowledge a person has about themselves that makes up who they are (i.e., their identity).

6. This work is a derivative of The Complete Subjective Health Assessment by Lapum, St-Amant, Hughes, Petrie, Morrell, and Mistry licensed under CC BY-SA 4.0
7. American Nurses Association. (2021). *Nursing: Scope and standards of practice* (4th ed.). American Nurses Association.

Self-esteem: A person's self-evaluation of their self-concept as being worthy or unworthy.

Sexual orientation: The preferred term used when referring to an individual's physical and/or emotional attraction to the same and/or opposite gender.[8]

Sign: Objective data found by the nurse or health care provider when assessing a patient.

Spirituality: A way of living that comes from a set of meanings, values, and beliefs that are important to a person.[9]

Subjective data: Information obtained from the patient and/or family members that offers important cues from their perspectives.

Symptom: Subjective data that the patient reports, such as "I feel dizzy."

Value: An accepted principle or standard of an individual or group.[10]

Voiding: Medical terminology used for urinating.

8. The Joint Commission. (2011). *Advancing effective communication, cultural competence, and patient- and family-centered care for the lesbian, gay, bisexual, and transgender (LGBT) community: A field guide*. https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/health-equity/lgbtfieldguide_web_linked_verpdf.pdf downloaded from https://www.jointcommission.org/resources/patient-safety-topics/health-equity/#t=_Tab_StandardsFAQs&sort=relevancy
9. Gordon, M. (2008). *Assess notes nursing: Nursing assessment and diagnostic reasoning for clinical practice.* F. A. Davis Company.
10. Gordon, M. (2008). *Assess notes nursing: Nursing assessment and diagnostic reasoning for clinical practice.* F. A. Davis Company.

Chapter Resources A: Sample Health History Form

View a Sample Health History Form.

PART III

CHAPTER 3 BLOOD PRESSURE

3.1 Blood Pressure Introduction

Learning Objectives

- Accurately measure and document blood pressure using American Heart Association standards
- Adapt the procedure to reflect variations across the life span
- Recognize and report significant deviations from blood pressure norms

The accurate measurement of blood pressure is important for ensuring patient safety and optimizing body system function. Blood pressure measurements are used by health care providers to make important decisions about a patient's care. Blood pressure measurements help providers make decisions about whether a patient needs fluids or prescription medications. It is crucial to follow the proper steps to obtain a patient's blood pressure to ensure the care team has accurate data to help make health care decisions and determine a plan of care.

Subjective Assessment

Before taking a person's blood pressure, it is important to determine if they have a history of elevated blood pressure or if they are taking any blood pressure medication. It is helpful to establish a baseline by asking their usual blood pressure reading or reviewing previous records in their chart. It is also important to determine if there are any arm restrictions such as those due to a fistula, mastectomy, stroke, or IV line before measuring blood pressure. See Table 3.3a for sample interview questions associated with the subjective assessment of blood pressure.

Table 3.3a Interview Questions for Subjective Assessment of Blood Pressure

Interview Questions
Have you ever been diagnosed with an elevated blood pressure? • Please describe the treatment.
Are you currently taking any medications, herbs, or supplements for your blood pressure? • Please identify what you are taking.
Do you have any restrictions on taking blood pressure in your arms such as those due to a fistula or mastectomy? • Please describe the restrictions.
What is your usual blood pressure reading?
Do you take your blood pressure at home? • What time of day do your take the reading? • Where do you obtain the reading from (i.e., cuff location and placement)? • What is the range of results that you commonly receive in the home setting?
If applicable: • Are you experiencing any symptoms related to high or low blood pressure now, such as a severe headache, dizziness with position changes, light-headedness, or fainting episodes?

Objective Assessment

Inspection

Before obtaining a blood pressure reading, it is important to inspect and

consider conditions that would prevent the use of a blood pressure cuff, such as a history of clots or presence of current clots, lymphedema, wounds, a fistula, or current IV access lines. If these conditions exist, obtain the blood pressure in an alternative extremity.

Life Span Considerations

Children

Blood pressure measurement is not routinely performed on children under the age of 3 unless there are cardiac concerns.

Older Adults

Blood pressure measurements are sometimes difficult to hear in older adults. For patients who are clinically stable and Korotkoff sound auscultation is difficult, doppler auscultation may be helpful.

Blood pressure assessment should be completed after the patient has rested for a minimum of five minutes. If the patient has ingested caffeine or nicotine within 30 minutes before measuring blood pressure, this should be documented with the reading.

There are times when it is difficult to auscultate Korotkoff sounds. As a result, the care team must decide what alternate measures could be performed to obtain accurate blood pressure results. For patients who are critically ill or hemodynamically unstable, an arterial line may be placed

directly into an artery to measure blood pressure. This is an invasive procedure and is not used for routine monitoring.

See Table 3.3b for a comparison of expected versus unexpected findings when assessing blood pressure.

Table 3.3b Expected Versus Unexpected Findings on Blood Pressure Assessment

Assessment	Expected Findings	Unexpected Findings (Document or notify provider if this is a new finding*)
Inspection	Not applicable	Evidence of fistula, lymphadenopathy, IVs, clots, deficits from a stroke, or other restrictions from using the arm for blood pressure readings should be documented and communicated in handoff reports for continuity of care.
Auscultation	Able to identify Korotkoff sounds and blood pressure reading within expected parameters	Unable to identify Korotkoff sounds or blood pressure readings are outside of expected parameters.
Palpation	Able to palpate pulse	Unable to palpate pulse.
***CRITICAL CONDITIONS to report immediately**		Blood pressure readings are outside of expected parameters for this patient's age or the patient has symptoms associated with a blood pressure that is out of range.

3.2 Blood Pressure Basics

What is Blood Pressure?

A blood pressure reading is the measurement of the force of blood against the walls of the arteries as the heart pumps blood through the body. It is reported in millimeters of mercury (mmHg). This pressure changes in the arteries when the heart is contracting compared to when it is resting and filling with blood. Blood pressure is typically expressed as the reflection of two numbers, systolic pressure and diastolic pressure. The **systolic blood pressure** is the maximum pressure on the arteries during systole, the phase of the heartbeat when the ventricles contract. This is the top number of a blood pressure reading. **Systole** causes the ejection of blood out of the ventricles and into the aorta and pulmonary arteries. The **diastolic blood pressure** is the resting pressure on the arteries during **diastole**, the phase between each contraction of the heart when the ventricles are filling with blood. This is the bottom number of the blood pressure reading.[1] Therefore, 120/80 indicates the systolic blood pressure is 120 mm Hg and the diastolic blood pressure is 80 mm Hg.

Blood pressure measurements are obtained using a stethoscope and a **sphygmomanometer**, also called a blood pressure cuff. To obtain a manual blood pressure reading, the blood pressure cuff is placed around a patient's extremity, and a stethoscope is placed over an artery. For most blood pressure readings, the cuff is usually placed around the upper arm, and the stethoscope is placed over the brachial artery. The cuff is inflated to constrict the artery until the pulse is no longer palpable, and then it is deflated slowly. The American Heart Association (AHA) recommends that the blood pressure cuff be inflated at least 30 mmHg above the point at which the radial pulse is no longer palpable. The first appearance of sounds, called **Korotkoff sounds**, are noted as the systolic blood pressure

1. This work is a derivative of Vital Sign Measurement Across the Lifespan - 1st Canadian Edition by Ryerson University licensed under CC BY 4.0

reading. Korotkoff sounds are named after Dr. Korotkoff, who first discovered the audible sounds of blood pressure when the arm is constricted.[2] The blood pressure cuff continues to be deflated until Korotkoff sounds disappear. The last Korotkoff sounds reflect the diastolic blood pressure reading.[3] It is important to deflate the cuff slowly at no more than 2-3 mmHg per second to ensure that the absence of pulse is noted promptly and that the reading is accurate. Blood pressure readings are documented as systolic blood pressure/diastolic pressure, for example, 120/80 mmHg.

Abnormal blood pressure readings can signify an area of concern and a need for intervention. Normal adult blood pressure is less than 120/80 mmHg. **Hypertension** is the medical term for elevated blood pressure readings of 130/80 mmHg or higher. See Table 3.2 for blood pressure categories according to the 2017 American College of Cardiology and American Heart Association Blood Pressure Guidelines.[4] Prior to diagnosing a person with hypertension, the health care provider will calculate an average blood pressure based on two or more blood pressure readings obtained on two or more occasions.

> For more information about hypertension and blood pressure medications, visit the "Cardiovascular and Renal System" chapter in Open RN *Nursing Pharmacology*.

Hypotension is the medical term for low blood pressure readings less than

2. This work is a derivative of StatPearls by Campbell and Pillarisetty licensed under CC BY 4.0
3. This work is a derivative of Clinical Procedures for Safer Patient Care by British Columbia Institute of Technology licensed under CC BY 4.0
4. American College of Cardiology. Whelton, P. K., Carey, R. M., Aronow, W. S.., et al. (2018, May 7). *2017 guidelines for high blood pressure in adults.* https://www.acc.org/latest-in-cardiology/ten-points-to-remember/2017/11/09/11/41/2017-guideline-for-high-blood-pressure-in-adults

90/60 mmHg.[5] Hypotension can be caused by dehydration, bleeding, cardiac conditions, and the side effects of many medications. Hypotension can be of significant concern because of the potential lack of perfusion to critical organs when blood pressures are low. **Orthostatic hypotension** is a drop in blood pressure that occurs when moving from a lying down (supine) or seated position to a standing (upright) position. When measuring blood pressure, orthostatic hypotension is defined as a decrease in blood pressure by at least 20 mmHg systolic or 10 mmHg diastolic within three minutes of standing. When a person stands, gravity moves blood from the upper body to the lower limbs. As a result, there is a temporary reduction in the amount of blood in the upper body for the heart to pump, which decreases blood pressure. Normally, the body quickly counteracts the force of gravity and maintains stable blood pressure and blood flow. In most people, this transient drop in blood pressure goes unnoticed. However, some patients with orthostatic hypotension can experience light-headedness, dizziness, or fainting. This is a significant safety concern because of the increased risk of falls and injury, particularly in older adults.[6] Orthostatic hypotension is also commonly referred to a postural hypotension. When obtaining orthostatic vital signs, the pulse rate may also be collected. If the pulse increases by 30 beats/minute or more while the patient stands (or sits if unable to stand), this indicates a significant change.

Orthostatic Vital Signs
Perform the following actions when obtaining orthostatic vital signs:

1. Have the patient stand upright for 1 minute if able.
2. Obtain the blood pressure measurement while the

5. National Heart, Lung, and Blood Institute. (n.d.). *Low blood pressure*. https://www.nhlbi.nih.gov/health-topics/low-blood-pressure
6. U.S. National Library of Medicine. (2020, June 23). *Orthostatic hypotension*. https://ghr.nlm.nih.gov/condition/orthostatic-hypotension

patient stands using the same arm and the same equipment as the previous measurement that was taken with patient lying or sitting.

3. Obtain the radial pulse again.
4. Repeat the blood pressure and radial pulse measurements again at 3 minutes. Waiting several minutes before repeating the measurements allows time for the autonomic nervous system to compensate for blood volume shifts after position change in the patient without orthostatic hypotension.
5. If the patient has symptoms that suggest orthostatic hypotension but doesn't have documented orthostatic hypotension, repeat blood pressure measurement.

Tip: Some patients may not demonstrate significant decreases in blood pressure until they stand for more than 3 minutes.

Table 3.2 Blood Pressure Categories[7]

Blood Pressure Category	Systolic mm Hg	Diastolic mm Hg
Normal	Less than 120	Less than80
Elevated	120-129	Less than 80
Stage 1	130-139	80-89
Stage 2	140 or higher	Greater or equal to 90
Hypertensive Crisis	Greater than 180	Greater than 120

7. American College of Cardiology. Whelton, P. K., Carey, R. M., Aronow, W. S.., et al. (2018, May 7). *2017 guidelines for high blood pressure in adults.* https://www.acc.org/latest-in-cardiology/ten-points-to-remember/2017/11/09/11/41/2017-guideline-for-high-blood-pressure-in-adults

View Ahmend Alzawi's Korotkoff sounds video on YouTube.[8]

Equipment to Measure Blood Pressure

Manual Blood Pressure

A sphygmomanometer, commonly called a blood pressure cuff, is used to measure blood pressure while Korotkoff sounds are auscultated using a stethoscope. See Figure 3.1[9] for an image of a sphygmomanometer.

8. Alzawi, A. (2015, November 19). *Korotkoff+blood+pressure+sights+and+sounds SD* [Video]. YouTube. All rights reserved. https://youtu.be/UfCr_wUepxo
9. "Sphygmomanometer&Cuff.JPG" by ML5 is in the Public Domain.

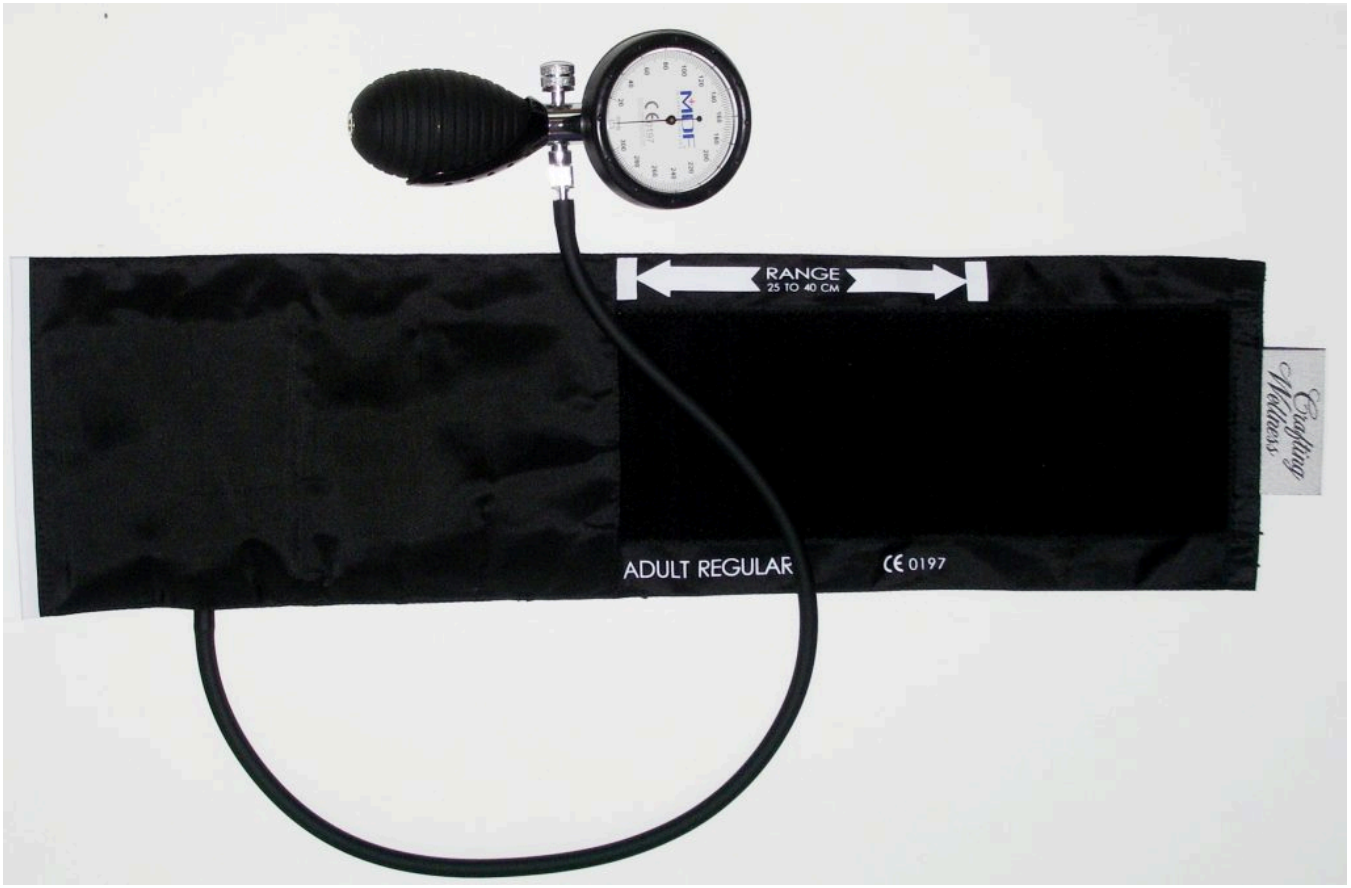

Figure 3.1 A Sphygmomanometer

There are various sizes of blood pressure cuffs. It is crucial to select the appropriate size for the patient to obtain an accurate reading. An undersized cuff will cause an artificially high blood pressure reading, and an oversized cuff will produce an artificially low reading. See Figure 3.2[10] for an image of various sizes of blood pressure cuffs ranging in size for a large adult to an infant.

10. "BP-Multiple-Cuff-Sizes.jpg" by British Columbia Institute of Technology (BCIT) is licensed under CC BY 4.0. Access for free at https://opentextbc.ca/vitalsign/chapter/how-is-blood-pressure-measured/

Figure 3.2 Sizes of Blood Pressure Cuffs

The width of the cuff should be 40% of the person's arm circumference, and the length of the cuff's bladder should be 80–100% of the person's arm circumference. Keep in mind that only about half of the blood pressure cuff is the bladder and the other half is cloth with a hook and loop fastener to secure it around the arm.

View Ryerson University's accurate blood pressure cuff sizing video on YouTube.[11]

11. Ryerson University. (2018, March 21). *Blood pressure - Accurate cuff sizing* [Video]. YouTube. All rights reserved. https://youtu.be/uNTMwoJTfFE

Automatic Blood Pressure Equipment

Automatic blood pressure monitors are often used in health care settings to efficiently measure blood pressure for multiple patients or to repeatedly measure a single patient's blood pressure at a specific frequency such as every 15 minutes. See Figure 3.3[12] for an image of an automatic blood pressure monitor. To use an automatic blood pressure monitor, appropriately position the patient and place the correctly sized blood pressure cuff on their bare arm or other extremity. Press the start button on the monitor. The cuff will automatically inflate and then deflate at a rate of 2 mmHg per second. The monitor digitally displays the blood pressure reading when done. If the blood pressure reading is unexpected, it is important to follow up by obtaining a reading using a manual blood pressure cuff. Additionally, automatic blood pressure monitors should not be used if the patient has a rapid or irregular heart rhythm, such as atrial fibrillation, or has tremors as it may lead to an inaccurate reading.

12. "Automatische bloeddrukmeter (0).jpg" by Harmid is in the Public Domain.

Figure 3.3 Automatic Blood Pressure Monitor

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://wtcs.pressbooks.pub/nursingskills/?p=485#h5p-15

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://wtcs.pressbooks.pub/nursingskills/?p=485#h5p-14

Sample Documentation of Expected Findings

Blood pressure 120/80 on the left arm with the patient in a seated position using a manual cuff.

Sample Documentation of Unexpected Findings

Blood pressure reading on right arm 160/95. Blood pressure reading left arm 154/93 after patient rested 5 minutes. Reports no history of hypertension and currently not taking any blood pressure medications. Denies dizziness, headache, visual changes, or light-headedness. Dr. Smith notified of all of above and order for furosemide 20 mg PO now received.

3.5 Checklist for Manual Blood Pressure

Use the checklist below to review the steps for obtaining a “Manual Blood Pressure.”

Note: The two-step method includes the first step of inflating the cuff and palpating the radial pulse to estimate the systolic blood pressure before obtaining the blood pressure reading. This procedure is based on current AHA recommendations.[1]

View an instructor demonstration YouTube video on assessing blood pressure[2]:

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://wtcs.pressbooks.pub/nursingskills/?p=491#oembed-1

Steps

Disclaimer: Always review and follow agency policy regarding this specific skill.

1. Gather supplies: blood pressure cuff and stethoscope. (Select an appropriately sized cuff for the patient.)
    - The width of the cuff should be 40% of the person’s arm circumference, and the length of the cuff’s bladder should be

1. Chobanian, A. V., Bakris, G. L., Black, H. R., Cushman, W. C., Green, L. A., Izzo, J. L., Jones Jr., D. W., Materson, B. J., Oparil, S., Wright Jr., J., Roccella, E. J., & National High Blood Pressure Education Program Coordinating Committee. (2003). Seventh report of the Joint National Committee on the Prevention, Detection, Evaluation and Treatment of High Blood Pressure. *Hypertension, 42*(6), 1206-1252. https://doi.org/10.1161/01.HYP.0000107251.49515.c2
2. Open RN Project. (2021, November 11). *Assessing blood pressure* [Video]. YouTube. Video licensed under CC-BY-4.0. https://youtu.be/VvLtwcpa7GA

80–100% of the person’s arm circumference.

2. Perform safety steps:

    - Perform hand hygiene.
    - Check the room for transmission-based precautions.
    - Introduce yourself, your role, the purpose of your visit, and an estimate of the time it will take.
    - Confirm patient ID using two patient identifiers (e.g., name and date of birth).
    - Explain the process to the patient and ask if they have any questions.
    - Be organized and systematic.
    - Use appropriate listening and questioning skills.
    - Listen and attend to patient cues.
    - Ensure the patient’s privacy and dignity.
    - Assess ABCs.

3. Cleanse the stethoscope and blood pressure cuff prior to placing it on the patient’s skin.
4. Place the patient in a relaxed reclining or sitting position. The patient should be seated quietly for at least five minutes in a chair prior to blood pressure measurement. Ask the patient which arm they prefer to use. Be aware of conditions that contraindicate the use of an arm for blood pressure measurement, such as a previous mastectomy or the presence of a fistula. During the procedure, both feet should be on the floor and the arm should be supported at heart level.

    - Adapt the procedure to life span considerations of the patient.

5. Remove or rearrange clothing so the cuff and the stethoscope are on bare skin.
6. Center the bladder of the blood pressure cuff over the brachial artery with the lower margin 1" above the antecubital space. Fit the cuff

evenly and snugly. Palpate the brachial artery in the antecubital space.

7. Locate the radial pulse.
8. Inflate the cuff rapidly (while palpating the radial or brachial pulse) to the level at which pulsations are no longer felt and inflate the cuff 30 mmHg above the palpated pressure or the patient's usual blood pressure. Note the level and rapidly deflate the cuff; wait 30 seconds.
9. With the eartips of the stethoscope placed downward and forward, place the bell/diaphragm lightly on the brachial artery and rapidly inflate the cuff to 30 points above where the brachial or radial pulse is no longer felt.
10. Deflate the cuff gradually at a constant rate by opening the valve on the bulb (2-3 mm Hg/second) until the first Korotkoff sound is heard. Note the systolic pressure.
11. Continue to deflate the cuff slowly at 2 mm Hg/second. Note the point at which Korotkoff sounds disappear completely as the diastolic pressure.
12. Deflate the cuff completely and remove the cuff from the patient's arm.
13. Inform the patient of the blood pressure reading.
14. Cleanse the stethoscope and blood pressure cuff.
15. Perform proper hand hygiene.
16. Ensure safety measures when leaving the room:

    - CALL LIGHT: Within reach
    - BED: Low and locked (in lowest position and brakes on)
    - SIDE RAIL: Secured
    - TABLE: Within reach
    - ROOM: Risk-free for falls (scan room and clear any obstacles)

17. Document findings and report significant deviations from norms according to agency policy.

3.6 Supplementary Video of Blood Pressure Assessment

View a supplementary YouTube video on Blood Pressure Assessment[1]

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://wtcs.pressbooks.pub/nursingskills/?p=494#oembed-1

1. RegisteredNurseRN. (2019, June 4). *Blood pressure measurement: How to check blood pressure manually* [Video]. YouTube. All rights reserved. Video used with permission. https://youtu.be/UGOoeqSo_ws

3.7 Learning Activities

Learning Activities

(Answers to "Learning Activities" can be found in the "Answer Key" at the end of the book. Answers to interactive activity elements will be provided within the element as immediate feedback.)

You are a nurse assigned to help with blood pressure screenings at the local senior center. **What elements must be considered when selecting equipment and location of blood pressure assessment?**

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https://wtcs.pressbooks.pub/nursingskills/?p=496#h5p-118

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https://wtcs.pressbooks.pub/nursingskills/?p=496#h5p-13

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://wtcs.pressbooks.pub/nursingskills/?p=496#h5p-27

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://wtcs.pressbooks.pub/nursingskills/?p=496#h5p-143

"2 Step Blood Pressure Sequencing Activity" by Susan Jepsen for Lansing Community College is licensed under CC BY 4.0

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://wtcs.pressbooks.pub/nursingskills/?p=496#h5p-144

"Orthostatic Blood Pressure Management Activity" by Susan Jepsen for Lansing Community College is licensed under CC BY 4.0

- Test your clinical judgment with an NCLEX Next Generation-style question: Chapter 3, Assignment 1.

- Test your clinical judgment with an NCLEX Next Generation-style question: Chapter 3, Assignment 2.

- Test your clinical judgment with an NCLEX Next Generation-style question: Chapter 3, Assignment 3.

III Glossary

Diastole: The phase between each contraction of the heart when the ventricles are filling with blood.

Diastolic blood pressure: The resting pressure of blood on the arteries between each cardiac contraction.

Hypertension: Elevated blood pressure over 130/80 mmHg in an adult.

Hypotension: Decreased blood pressure less than 90/60 mmHg in an adult.

Korotkoff sounds: The audible sounds of blood pressure named after Dr. Korotkoff who discovered them.

Orthostatic hypotension: A decrease in blood pressure by at least 20 mmHg systolic or 10 mmHg diastolic within three minutes of standing from a seated or lying position.

Sphygmomanometer: A device used to measure blood pressure and is commonly referred to as a blood pressure cuff.

Systole: The phase of the heartbeat when the left ventricle contracts and pumps blood into the arteries.

Systolic blood pressure: The maximum pressure of blood on the arteries during the contraction of the left ventricle of the heart referred to as systole.

PART IV

CHAPTER 4 ASEPTIC TECHNIQUE

4.1 Aseptic Technique Introduction

Learning Objectives

- Perform appropriate hand hygiene
- Use standard precautions
- Use category-specific, transmission-based precautions
- Maintain a sterile field and equipment
- Apply and safely remove sterile gloves and personal protective equipment
- Dispose of contaminated wastes appropriately

According to the Centers for Disease Control and Prevention (CDC), over 2 million patients in America contract a healthcare-associated infection, and 99,000 patients die from a healthcare-associated infection every year.[1] **Healthcare-associated infections** (HAIs) are unintended and often preventable infections caused by care received in a health care setting. Healthcare-associated infections can be prevented by consistently following standard precautions and transmission-based precautions outlined by the CDC (2020). Standard precautions are used when caring for all patients and include performing appropriate **hand hygiene**; wearing **personal protective equipment** when indicated; implementing category-specific transmission precautions; encouraging respiratory hygiene; and following environmental infection control measures, including handling of sharps, laundry, and hazardous waste. Additional

1. The Joint Commission. (n.d.). *Hand hygiene*. https://www.centerfortransforminghealthcare.org/improvement-topics/hand-hygiene/?_ga=2.185680553.1649963228.1601313691-322773533.1571518854

infection control measures include the appropriate use of aseptic technique and sterile technique when performing nursing procedures to protect the patient from transmission of microorganisms.[2] Each of these strategies to keep patients and health care workers free of infection is discussed in further detail in this chapter.

2. Collins, A. S. (2008). Preventing health care-associated infections. In Hughes, R.G. (Ed.). *Patient safety and quality: An evidence-based handbook for nurses*. https://www.ncbi.nlm.nih.gov/books/NBK2683/

Standard Versus Transmission-Based Precautions

Standard Precautions

Standard precautions are used when caring for all patients to prevent health care associated infections. According to the Centers for Disease Control and Prevention (CDC), **standard precautions** are "the minimum infection prevention practices that apply to all patient care, regardless of suspected or confirmed infection status of the patient, in any setting where health care is delivered."[1] They are based on the principle that all blood, body fluids (except sweat), nonintact skin, and mucous membranes may contain transmissible infectious agents. These standards reduce the risk of exposure for the health care worker and protect the patient from potential transmission of infectious organisms.

Current standard precautions according to the CDC (2019) include the following:

1. Appropriate hand hygiene
2. Use of personal protective equipment (e.g., gloves, gowns, masks, eyewear) whenever infectious material exposure may occur
3. Appropriate patient placement and care using transmission-based precautions when indicated
4. Respiratory hygiene/cough etiquette
5. Proper handling and cleaning of environment, equipment, and devices
6. Safe handling of laundry
7. Sharps safety (i.e., engineering and work practice controls)
8. Aseptic technique for invasive nursing procedures such as parenteral

1. Centers for Disease Control and Prevention. (2016, January 26). *Standard precautions for all patient care*. https://www.cdc.gov/infectioncontrol/basics/standard-precautions.html

medication administration[2]

Each of these standard precautions is described in more detail in the following subsections.

Transmission-Based Precautions

In addition to standard precautions, transmission-based precautions are used for patients with documented or suspected infection, or colonization, of highly transmissible or epidemiologically important pathogens. Epidemiologically important pathogens include, but are not limited to, Coronavirus disease (COVID-19), *Clostridium difficile* (C-diff), *Methicillin-resistant staphylococcus aureus* (MRSA), *Vancomycin-resistant enterococci* (VRE), *Respiratory syncytial sirus* (RSV), measles, and tuberculosis (TB). For patients with these types of pathogens, standard precautions are used along with specific transmission-based precautions.

There are four categories of transmission-based precautions: **contact precautions**, **enhanced barrier precautions**, **droplet precautions**, and **airborne precautions**. Transmission-based precautions are used when the route(s) of transmission is (are) not completely interrupted using standard precautions alone. Some diseases, such as tuberculosis, have multiple routes of transmission so more than one transmission-based precautions category must be implemented. See Table 4.2 outlining the categories of transmission precautions with associated PPE and other precautions. When possible, patients with transmission-based precautions should be placed in a single occupancy room with dedicated patient care equipment (e.g., blood pressure cuffs, stethoscope, thermometer). Transport of the patient and unnecessary movement outside the patient room should be limited. However, when transmission-based precautions

2. Centers for Disease Control and Prevention. (2016, January 26). *Standard precautions for all patient care*. https://www.cdc.gov/infectioncontrol/basics/standard-precautions.html

are implemented, it is also important for the nurse to make efforts to counteract possible adverse effects of these precautions on patients, such as anxiety, depression, perceptions of stigma, and reduced contact with clinical staff.

Table 4.2 Transmission-Based Precautions[3]

3. Siegel, J. D., Rhinehart, E., Jackson, M., Chiarello, L., & Healthcare Infection Control Practices Advisory Committee. (2019, July 22). *2007 guideline for isolation precautions: Preventing transmission of infectious agents in healthcare settings*. https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html

Precaution	Implementation	PPE and Other Precautions
Contact	Known or suspected infections with increased risk for contact transmission (e.g., draining wounds, fecal incontinence) or with epidemiologically important organisms, such as C-diff, MRSA, VRE, or RSV	• Gloves • Gown • Dedicated equipment Note: Use only soap and water for hand hygiene in patients with C. difficile infection.
Enhanced barrier	Used during high-contact resident care activities for individuals colonized or infected with a multidrug-resistant organism (MDRO), as well as those at increased risk of MDRO acquisition	• Gloves • Gown
Droplet	Known or suspected infection with pathogens transmitted by large respiratory droplets generated by coughing, sneezing, or talking, such as influenza, coronavirus, or pertussis	• Mask • Goggles or face shield

Airborne	Known or suspected infection with pathogens transmitted by small respiratory droplets, such as measles, tuberculosis, and disseminated herpes zoster	Fit-tested N-95 respirator or PAPR • Airborne infection isolation room • Single patient room • Patient door closed • Restricted susceptible personnel room entry

View a list of transmission-based precautions used for specific medical conditions at the CDC Guideline for Isolation Precautions.

PATIENT TRANSPORT

Several principles are used to guide transport of patients requiring transmission-based precautions. In the inpatient and residential settings, these principles include the following:

- Limiting transport for essential purposes only, such as diagnostic and therapeutic procedures that cannot be performed in the patient's room

- Using appropriate barriers on the patient consistent with the route and risk of transmission (e.g., mask, gown, covering the affected areas

when infectious skin lesions or drainage is present)

- Notify other health care personnel involved in the care of the patient of the transmission-based precautions. For example, when transporting the patient to radiology, inform the radiology technician of the precautions.[4]

Appropriate Hand Hygiene

Hand hygiene is the single most important practice to reduce the transmission of infectious agents in health care settings and is an essential element of standard precautions.[5] Routine handwashing during appropriate moments is a simple and effective way to prevent infection. However, it is estimated that health care professionals, on average, properly clean their hands less than 50% of the time it is indicated.[6] The Joint Commission, the organization that sets evidence-based standards of care for hospitals, recently updated its hand hygiene standards in 2018 to promote enforcement. If a Joint Commission surveyor witnesses an individual failing to properly clean their hands when it is indicated, a deficiency will be cited requiring improvement by the agency. This deficiency could potentially jeopardize a hospital's accreditation status and their ability to receive payment for patient services. Therefore, it is essential for all health care workers to ensure they are using proper hand hygiene at the appropriate times.[7]

4. Siegel, J. D., Rhinehart, E., Jackson, M., Chiarello, L., & Healthcare Infection Control Practices Advisory Committee. (2019, July 22). *2007 guideline for isolation precautions: Preventing transmission of infectious agents in healthcare settings*. https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html
5. Siegel, J. D., Rhinehart, E., Jackson, M., Chiarello, L., & Healthcare Infection Control Practices Advisory Committee. (2019, July 22). *2007 guideline for isolation precautions: Preventing transmission of infectious agents in healthcare settings*. https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html
6. Centers for Disease Control and Prevention. (2019, April 29). *Hand hygiene in healthcare settings*. https://www.cdc.gov/handhygiene/
7. The Joint Commission. (n.d.). *Update: Citing observations of hand hygiene noncompliance*. https://www.jointcommission.org/-/media/tjc/documents/standards/jc-requirements/ambulatory-care/2018/

There are several evidence-based guidelines for performing appropriate hand hygiene. These guidelines include frequency of performing hand hygiene according to the care circumstances, solutions used, and technique performed. The Healthcare Infection Control Practices Advisory Committee (HICPAC) recommends health care personnel perform hand hygiene at specific times when providing care to patients. These moments are often referred to as the "**Moments for Hand Hygiene**."[8] See Figures 4.1[9] and 4.2[10] for an illustration and application of the five moments of hand hygiene. The five moments of hand hygiene are as follows:

- Immediately before touching a patient
- Before performing an aseptic task or handling invasive devices
- Before moving from a soiled body site to a clean body site on a patient
- After touching a patient or their immediate environment
- After contact with blood, body fluids, or contaminated surfaces (with or without glove use)

update_citing_observations_of_hand_hygiene_noncompliancepdf.pdf?db=web&hash=F89BFFFAEDA700CC2E667049D8F542B2

8. World Health Organization. (n.d.). *My 5 moments of hand hygiene*. https://www.who.int/infection-prevention/campaigns/clean-hands/5moments/en/
9. "5Moments_Image.gif" by World Health Organization is licensed under CC BY-NC-SA 3.0 IGO. Access for free at https://www.who.int/infection-prevention/campaigns/clean-hands/5moments/en/
10. This work is derived from "Hand_Hygiene_When_and_How_Leaflet.pdf" by World Health Organization and is licensed under CC BY-NC-SA 3.0 IGO. Access for free at https://www.who.int/infection-prevention/tools/hand-hygiene/workplace_reminders/en/

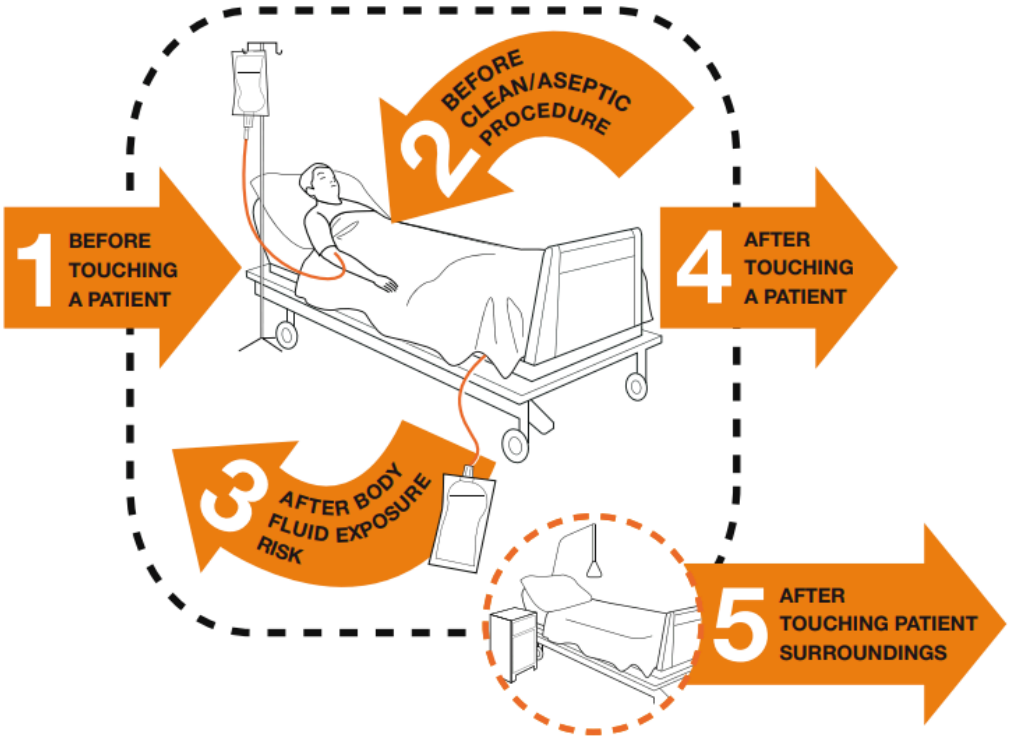

Figure 4.1 Five Moments of Hand Hygiene

1	**BEFORE TOUCHING A PATIENT**	**WHEN?** Clean your hands before touching a patient when approaching him/her. **WHY?** To protect the patient against harmful germs carried on your hands.
2	**BEFORE CLEAN/ ASEPTIC PROCEDURE**	**WHEN?** Clean your hands immediately before performing a clean/aseptic procedure. **WHY?** To protect the patient against harmful germs, including the patient's own, from entering his/her body.
3	**AFTER BODY FLUID EXPOSURE RISK**	**WHEN?** Clean your hands immediately after an exposure risk to body fluids (and after glove removal). **WHY?** To protect yourself and the health-care environment from harmful patient germs.
4	**AFTER TOUCHING A PATIENT**	**WHEN?** Clean your hands after touching a patient and her/his immediate surroundings, when leaving the patient's side. **WHY?** To protect yourself and the health-care environment from harmful patient germs.
5	**AFTER TOUCHING PATIENT SURROUNDINGS**	**WHEN?** Clean your hands after touching any object or furniture in the patient's immediate surroundings, when leaving – even if the patient has not been touched. **WHY?** To protect yourself and the health-care environment from harmful patient germs.

Figure 4.2 Five Moments of Hand Hygiene Expanded

When performing hand hygiene, washing with soap and water, or an approved alcohol-based hand rub solution that contains at least 60% alcohol, may be used. Unless hands are visibly soiled, an alcohol-based hand rub is preferred over soap and water in most clinical situations due to evidence of improved compliance. Handrubs are also preferred because they are generally less irritating to health care worker's hands. However, it is important to recognize that alcohol-based rubs do not eliminate some types of germs, such as *Clostridium difficile* (C-diff).

When using the alcohol-based handrub method, the CDC recommends the following steps. See Figure 4.3[11] for a handrub poster created by the World Health Organization.

11. This work is derived from "Hand_Hygiene_When_and_How_Leaflet.pdf" by World Health Organization and is licensed under CC BY-NC-SA 3.0 IGO. Access for free at https://www.who.int/infection-prevention/tools/hand-hygiene/workplace_reminders/en/

- **Apply** product to the palm of one hand in an amount that will cover all surfaces.
- **Rub** hands together, covering all the surfaces of the hands, fingers, and wrists until the hands are dry. Surfaces include the palms and fingers, between the fingers, the backs of the hands and fingers, the fingertips, and the thumbs.
- The process should take about 20 seconds, and the solution should be dry.[12]

12. Centers for Disease Control and Prevention. (2019, April 29). *Hand hygiene in healthcare settings.* https://www.cdc.gov/handhygiene/

Figure 4.3 WHO Handrub Poster

When washing with soap and water, the CDC recommends using the

following steps. See Figure 4.4[13] for an image of a handwashing poster created by the World Health Organization.

- **Wet** hands with warm or cold running water and apply facility-approved soap.
- **Lather** hands by rubbing them together with the soap. Use the same technique as the handrub process to clean the palms and fingers, between the fingers, the backs of the hands and fingers, the fingertips, and the thumbs.
- **Scrub** thoroughly for at least 20 seconds.
- **Rinse** hands well under clean, running water.
- **Dry** the hands using a clean towel or disposable toweling.
- **Use** a clean paper towel to shut off the faucet.[14]

13. "How_To_HandWash_Poster.pdf" by World Health Organization is licensed under CC BY-NC-SA 3.0 IGO. Access for free at https://www.who.int/infection-prevention/campaigns/clean-hands/5moments/en/
14. Centers for Disease Control and Prevention. (2019, April 29). *Hand hygiene in healthcare settings.* https://www.cdc.gov/handhygiene/

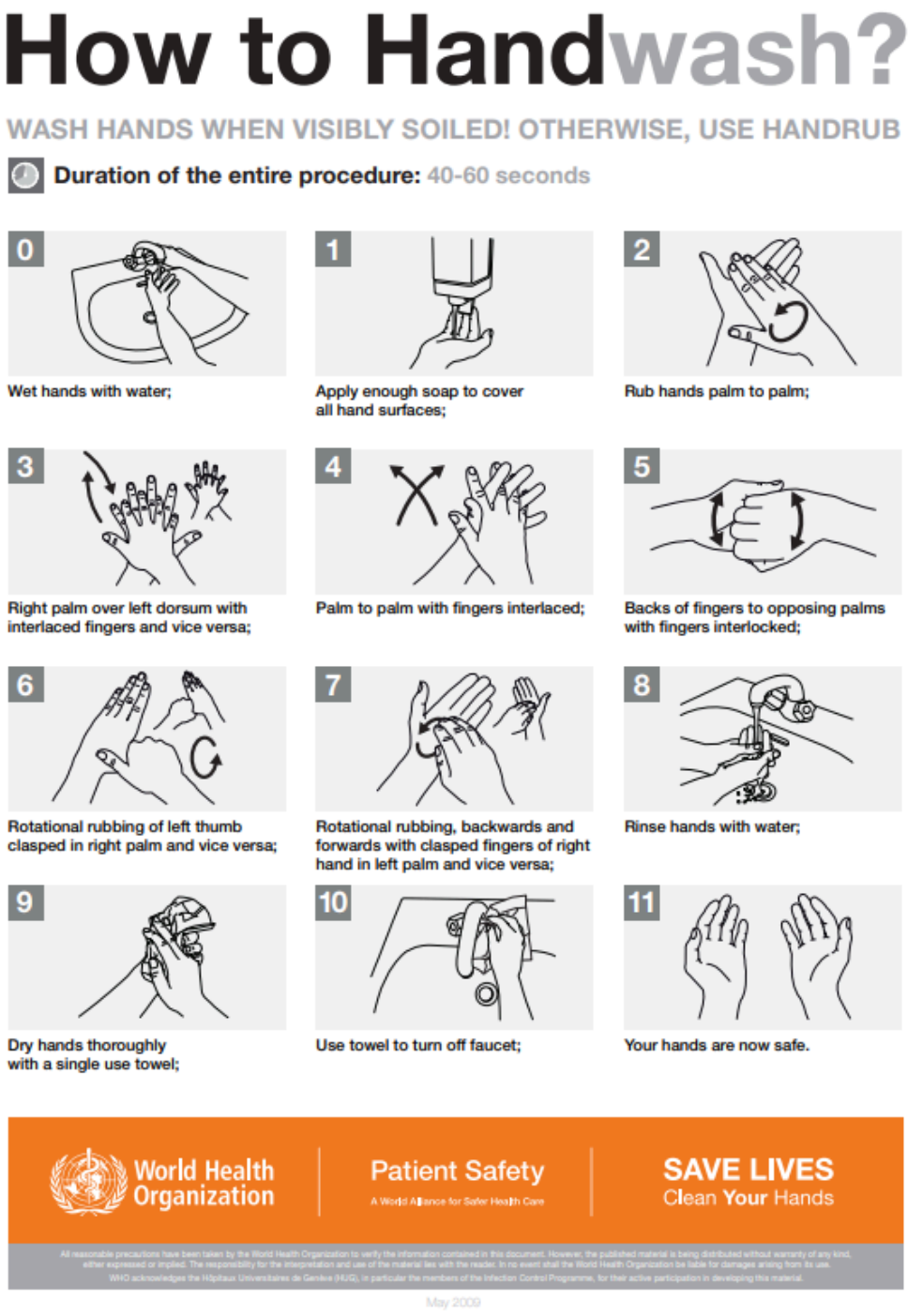

Figure 4.4 WHO Handwashing Poster

By performing hand hygiene at the proper moments and using appropriate techniques, you will ensure your hands are safe and you are not transmitting infectious organisms to yourself or others.

Hand Hygiene for Healthcare Workers on YouTube[15]

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://wtcs.pressbooks.pub/nursingskills/?p=1562#oembed-1

For more information about hand hygiene recommendations, view CDC's Hand Hygiene in Health Care Settings

Personal Protective Equipment (PPE)

Personal protective equipment (PPE) includes gloves, gowns, face shields, goggles, and masks used to prevent the spread of infection to and from patients and health care providers. Depending on the anticipated exposure, PPE may include the use of gloves, a fluid-resistant gown, goggles or a face shield, and a mask or respirator. When used for a patient with transmission-based precautions, PPE supplies are typically stored in an isolation cart next to the patient's room, and a card is posted on the door alerting staff and visitors to precautions needed before entering the room.

15. RegisteredNurseRN. (2018, December 1). *Hand hygiene for healthcare workers | Hand washing soap and water technique nursing skill* [Video]. YouTube. All rights reserved. Video used with permission. https://youtu.be/G5-Rp-6FMCQ

Gloves

Gloves protect both patients and health care personnel from exposure to infectious material that may be carried on the hands. Gloves are used to prevent contamination of health care personnel hands during activities such as the following:

- Anticipating direct contact with blood or body fluids, mucous membranes, nonintact skin, and other potentially infectious material
- Having direct contact with patients who are colonized or infected with pathogens transmitted by the contact route, such as *Vancomycin-resistant enterococci* (VRE), *Methicillin-resistant staphylococcus aureus* (MRSA), and *Respiratory syncytial virus* (RSV)
- Handling or touching visibly or potentially contaminated patient care equipment and environmental surfaces[16]

Nonsterile disposable medical gloves for routine patient care are made of a variety of materials, such as latex, vinyl, and nitrile. Many people are allergic to latex, so be sure to check for latex allergies for the patient and other health care professionals. See Figure 4.5[17] for an image of nonsterile medical gloves in various sizes in a health care setting. At times, gloves may need to be changed when providing care to a single patient to prevent cross-contamination of body sites. It is also necessary to change gloves if the patient interaction requires touching portable computer keyboards or other mobile equipment that is transported from room to room. Discarding gloves between patients is necessary to prevent transmission of infectious material. Gloves must not be washed for subsequent reuse because microorganisms cannot be reliably removed from glove surfaces, and continued glove integrity cannot be ensured.[18]

16. Centers for Disease Control and Prevention. (2016, January 26). *Standard precautions for all patient care*. https://www.cdc.gov/infectioncontrol/basics/standard-precautions.html
17. "Surgery Centre Accriditation.jpg" by Accredia is licensed under CC BY-SA 4.0
18. Siegel, J. D., Rhinehart, E., Jackson, M., Chiarello, L., & Healthcare Infection Control Practices Advisory

Figure 4.5 Nonsterile Medical Gloves

When gloves are worn in combination with other PPE, they are put on last. Gloves that fit snugly around the wrist should be used in combination

Committee. (2019, July 22). *2007 guideline for isolation precautions: Preventing transmission of infectious agents in healthcare settings*. https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html

with isolation gowns because they will cover the gown cuff and provide a more reliable continuous barrier for the arms, wrists, and hands.

Gloves should be removed properly to prevent contamination. See Figure 4.6[19] for an illustration of properly removing gloves. Hand hygiene should be performed following glove removal to ensure the hands will not carry potentially infectious material that might have penetrated through unrecognized tears or contaminated the hands during glove removal. One method for properly removing gloves includes the following steps:

- Grasp the outside of one glove near the wrist. Do not touch your skin.
- Peel the glove away from your body, pulling it inside out.
- Hold the removed glove in your gloved hand.
- Put your fingers inside the glove at the top of your wrist and peel off the second glove.
- Turn the second glove inside out while pulling it away from your body, leaving the first glove inside the second.
- Dispose of the gloves safely. Do not reuse.
- Perform hand hygiene immediately after removing the gloves.[20]

19. "poster-how-to-remove-gloves.pdf" by Centers for Disease Control and Prevention is in the Public Domain. Access for free at https://www.cdc.gov/vhf/ebola/resources/posters.html
20. Siegel, J. D., Rhinehart, E., Jackson, M., Chiarello, L., & Healthcare Infection Control Practices Advisory Committee. (2019, July 22). *2007 guideline for isolation precautions: Preventing transmission of infectious agents in healthcare settings*. https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html

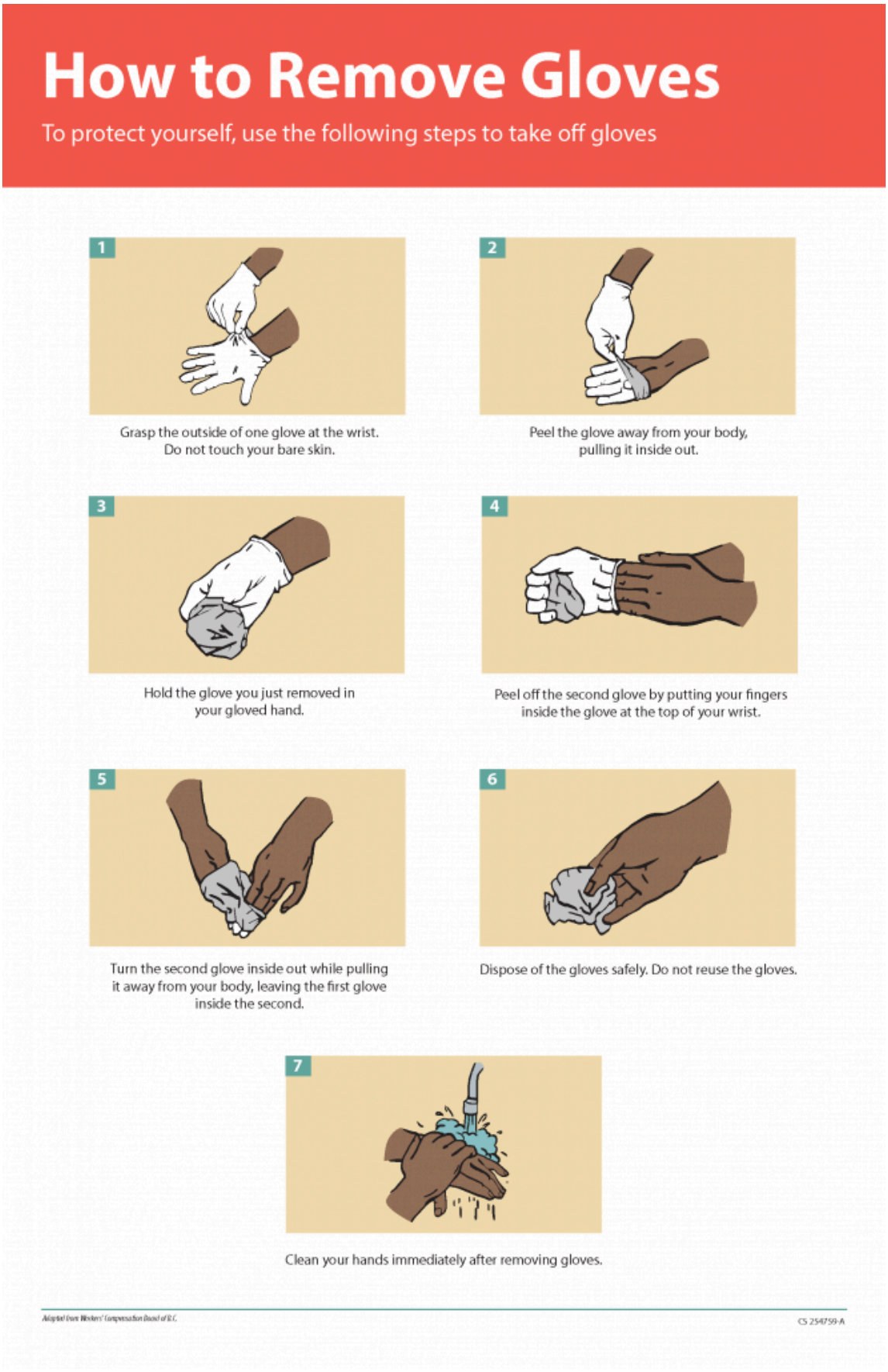

Figure 4.6 Proper Removal of Gloves to Prevent Contamination

Gowns

Isolation gowns are used to protect the health care worker's arms and exposed body areas and to prevent contamination of their clothing with blood, body fluids, and other potentially infectious material. Isolation gowns may be disposable or washable/reusable. See Figure 4.7[21] for an image of a nurse wearing an isolation gown along with goggles and a respirator. When using standard precautions, an isolation gown is worn only if contact with blood or body fluid is anticipated. However, when contact transmission-based precautions are in place, donning of both gown and gloves upon room entry is indicated to prevent unintentional contact of clothing with contaminated environmental surfaces.

Gowns are usually the first piece of PPE to be donned. Isolation gowns should be removed before leaving the patient room to prevent possible contamination of the environment outside the patient's room. Isolation gowns should be removed in a manner that prevents contamination of clothing or skin. The outer, "contaminated," side of the gown is turned inward and rolled into a bundle, and then it is discarded into a designated container to contain contamination. See more information about putting on and removing PPE in the subsection below.[22]

21. "U.S. Navy Doctors, Nurses and Corpsmen Treat COVID Patients in the ICU Aboard USNS Comfort (49825651378).jpg" by Navy Medicine is in the Public Domain.
22. Siegel, J. D., Rhinehart, E., Jackson, M., Chiarello, L., & Healthcare Infection Control Practices Advisory Committee. (2019, July 22). *2007 guideline for isolation precautions: Preventing transmission of infectious agents in healthcare settings.* https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html

Figure 4.7 Isolation Gown

Masks

The mucous membranes of the mouth, nose, and eyes are susceptible portals of entry for infectious agents. Masks are used to protect these sites from entry of large infectious droplets. See Figure 4.8[23] for an image of nurse wearing a surgical mask. Masks have three primary purposes in health care settings:

- Used by health care personnel to protect them from contact with infectious material from patients (e.g., respiratory secretions and sprays of blood or body fluids), consistent with standard precautions

23. "USNS Comfort (T-AH 20) Performs Surgery (49803007781).jpg" by Navy Medicine is in the Public Domain.

and droplet transmission precautions

- Used by health care personnel when engaged in procedures requiring sterile technique to protect patients from exposure to infectious agents potentially carried in a health care worker's mouth or nose
- Placed on coughing patients to limit potential dissemination of infectious respiratory secretions from the patient to others in public areas (i.e., respiratory hygiene)[24]

Masks may be used in combination with goggles or a face shield to provide more complete protection for the face. Masks should not be confused with respirators used during airborne transmission-based precautions to prevent inhalation of small, aerosolized infectious droplets.[25]

24. Siegel, J. D., Rhinehart, E., Jackson, M., Chiarello, L., & Healthcare Infection Control Practices Advisory Committee. (2019, July 22). *2007 guideline for isolation precautions: Preventing transmission of infectious agents in healthcare settings*. https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html
25. Siegel, J. D., Rhinehart, E., Jackson, M., Chiarello, L., & Healthcare Infection Control Practices Advisory Committee. (2019, July 22). *2007 guideline for isolation precautions: Preventing transmission of infectious agents in healthcare settings*. https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html

Figure 4.8 Surgical Mask

It is important to properly wear and remove masks to avoid contamination. See Figure 4.9[26] for CDC face mask recommendations for health care personnel.

26. "fs-facemask-dos-donts.pdf" by Centers for Disease Control and Prevention is in the Public Domain. Access for free at https://www.cdc.gov/coronavirus/2019-ncov/hcp/using-ppe.html

Figure 4.9 CDC Face Mask Recommendations

Goggles/Face Shields

Eye protection chosen for specific work situations (e.g., goggles or face shields) depends upon the circumstances of exposure, other PPE used, and personal vision needs. Personal eyeglasses are not considered

adequate eye protection. See Figure 4.10[27] for an image of a health care professional wearing a face shield along with a N95 respirator.

Figure 4.10 Face Shield and a N95 Respirator

Respirators and PAPRs

Respiratory protection used during airborne transmission precautions requires the use of special equipment. Traditionally, a fitted respirator mask with N95 or higher filtration has been worn by health care professionals to prevent inhalation of small airborne infectious particles. A user-seal check (formerly called a "fit check") should be performed by the wearer of a respirator each time a respirator is donned to minimize air leakage around the facepiece.

A newer piece of equipment used for respiratory protection is the powered air-purifying respirator (PAPR). A PAPR is an air-purifying respirator that uses a blower to force air through filter cartridges or canisters into the breathing zone of the wearer. This process creates an air

27. "Checking Personal Protective Equipment (PPE) in the fight against Ebola" by DFID - UK Department for International Development is licensed under CC BY 2.0

flow inside either a tight-fitting facepiece or loose-fitting hood or helmet, providing a higher level of protection against aerosolized pathogens, such as COVID-19, than a N95 respirator. See Figure 4.11[28] for an example of PAPR in use.

Figure 4.11 PAPR In Use

The CDC currently recommends N95 or higher level respirators for personnel exposed to patients with suspected or confirmed tuberculosis and other airborne diseases, especially during aerosol-generating procedures such as respiratory-tract suctioning.[29] It is important to apply, wear, and remove respirators appropriately to avoid contamination. See

28. "PAPRs_in_use_01.jpg" by Ca.garcia.s is licensed under CC BY-SA 4.0
29. Siegel, J. D., Rhinehart, E., Jackson, M., Chiarello, L., & Healthcare Infection Control Practices Advisory Committee. (2019, July 22). *2007 guideline for isolation precautions: Preventing transmission of infectious agents in healthcare settings*. https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html

Figure 4.12[30] for CDC recommendations when wearing disposable respirators.

Figure 4.12 CDC Recommendations for Wearing Disposable Respirators

30. "fs-respirator-on-off.pdf" by Centers for Disease Control and Prevention is in the Public Domain. Access for free at https://www.cdc.gov/coronavirus/2019-ncov/hcp/using-ppe.html

How to Put On (**Don**) PPE Gear

Follow agency policy for donning PPE according to transmission-based precautions. More than one donning method for putting on PPE may be acceptable. The CDC recommends the following steps for donning PPE[31]:

- Identify and gather the proper PPE to don. Ensure the gown size is correct.
- Perform hand hygiene using hand sanitizer or wash hands with soap and water.
- Put on the isolation gown. Tie all of the ties on the gown. Assistance may be needed by other health care personnel to tie back ties.
- Based on specific transmission-based precautions and agency policy, put on a mask or N95 respirator. The top strap should be placed on the crown (top) of the head, and the bottom strap should be at the base of the neck. If the mask has loops, hook them appropriately around your ears. Masks and respirators should extend under the chin, and both your mouth and nose should be protected. Perform a user-seal check each time you put on a respirator. If the respirator has a nosepiece, it should be fitted to the nose with both hands, but it should not be bent or tented. Masks typically require the nosepiece to be pinched to fit around the nose, but do not pinch the nosepiece of a respirator with one hand. Do not wear a respirator or mask under your chin or store it in the pocket of your scrubs between patients.
- Put on a face shield or goggles when indicated. When wearing an N95 respirator with eye protection, select eye protection that does not affect the fit or seal of the respirator and one that does not affect the position of the respirator. Goggles provide excellent protection for the eyes, but fogging is common. Face shields provide full-face coverage.
- Put on gloves. Gloves should cover the cuff (wrist) of the gown.

31. Centers for Disease Control and Prevention. (2020, August 19). *Using personal protective equipment (PPE)*. https://www.cdc.gov/coronavirus/2019-ncov/hcp/using-ppe.html

- You may now enter the patient's room.

How to Put On a Respirator on YouTube[32]

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://wtcs.pressbooks.pub/nursingskills/?p=1562#oembed-2

Donning and Doffing PPE on YouTube[33]

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://wtcs.pressbooks.pub/nursingskills/?p=1562#oembed-3

How to Take Off (**Doff**) PPE Gear

More than one doffing method for removing PPE may be acceptable. Train using your agency's procedure, and practice until you have successfully mastered the steps to avoid contamination of yourself and others. There are established cases of nurses dying from disease

32. RegisteredNurseRN. (2020, May 11). *N95 mask - How to wear | N95 respirator nursing skill tutorial* [Video]. YouTube. All rights reserved. Video used with permission. https://youtu.be/i-uD8rUwG48
33. RegisteredNurseRN. (2020, May 29). *PPE training video: Donning and doffing PPE nursing skill* [Video]. YouTube. All rights reserved. Video used with permission. https://youtu.be/iwvnA_b9Q8Y

transmitted during incorrect removal of PPE. Below are sample steps of doffing established by the CDC[34]:

- Remove the gloves. Ensure glove removal does not cause additional contamination of the hands. Gloves can be removed using more than one technique (e.g., glove-in-glove or bird beak).
- Remove the gown. Untie all ties (or unsnap all buttons). Some gown ties can be broken rather than untied; do so in a gentle manner and avoid a forceful movement. Reach up to the front of your shoulders and carefully pull the gown down and away from your body. Rolling the gown down is also an acceptable approach. Dispose of the gown in a trash receptacle. If it is a washable gown, place it in the specified laundry bin for PPE in the room.
- Health care personnel may now exit the patient room.
- Perform hand hygiene.
- Remove the face shield or goggles. Carefully remove the face shield or goggles by grabbing the strap and pulling upwards and away from head. Do not touch the front of the face shield or goggles.
- Remove and discard the respirator or face mask. Do not touch the front of the respirator or face mask. Remove the bottom strap by touching only the strap and bringing it carefully over the head. Grasp the top strap and bring it carefully over the head, and then pull the respirator away from the face without touching the front of the respirator. For masks, carefully untie (or unhook ties from the ears) and pull the mask away from your face without touching the front.
- Perform hand hygiene after removing the respirator/mask. If your workplace is practicing reuse, perform hand hygiene before putting it on again.

34. Centers for Disease Control and Prevention. (2020, August 19). *Using personal protective equipment (PPE)*. https://www.cdc.gov/coronavirus/2019-ncov/hcp/using-ppe.html

View a YouTube Video from the CDC on Putting on PPE[35]

View a YouTube Video from the CDC on Removing PPE[36]

Respiratory Hygiene

Respiratory hygiene is targeted at patients, accompanying family members and friends, and health care workers with undiagnosed transmissible respiratory infections. It applies to any person with signs of illness, including cough, congestion, rhinorrhea, or increased production of respiratory secretions when entering a health care facility. See Figure 4.13[37] for an example of a "Cover Your Cough" poster used in public areas to promote respiratory hygiene. The elements of respiratory hygiene include the following:

- Education of health care facility staff, patients, and visitors
- Posted signs, in language(s) appropriate to the population served, with instructions to patients and accompanying family members or

35. Centers for Disease Control and Prevention. (2020, July 14). *Demonstration of donning (putting on) personal protective equipment (PPE)* [Video]. YouTube. All rights reserved. https://youtu.be/H4jQUBAlBrI
36. Centers for Disease Control and Prevention. (2020, April 21). *Demonstration of doffing (taking off) personal protective equipment (PPE)* [Video]. YouTube. All rights reserved. https://youtu.be/PQxOc13DxvQ
37. "cycphceng.pdf" by https://www.health.state.mn.us/index.html is in the Public Domain.

friends

- Source control measures for a coughing person (e.g., covering the mouth/nose with a tissue when coughing and prompt disposal of used tissues, or applying surgical masks on the coughing person to contain secretions)
- Hand hygiene after contact with one's respiratory secretions
- Spatial separation, ideally greater than 3 feet, of persons with respiratory infections in common waiting areas when possible.[38]

Health care personnel are advised to wear a mask and use frequent hand hygiene when examining and caring for patients with signs and symptoms of a respiratory infection. Health care personnel who have a respiratory infection are advised to avoid direct patient contact, especially with high-risk patients. If this is not possible, then a mask should be worn while providing patient care.[39]

38. Siegel, J. D., Rhinehart, E., Jackson, M., Chiarello, L., & Healthcare Infection Control Practices Advisory Committee. (2019, July 22). *2007 guideline for isolation precautions: Preventing transmission of infectious agents in healthcare settings*. https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html
39. Siegel, J. D., Rhinehart, E., Jackson, M., Chiarello, L., & Healthcare Infection Control Practices Advisory Committee. (2019, July 22). *2007 guideline for isolation precautions: Preventing transmission of infectious agents in healthcare settings*. https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html

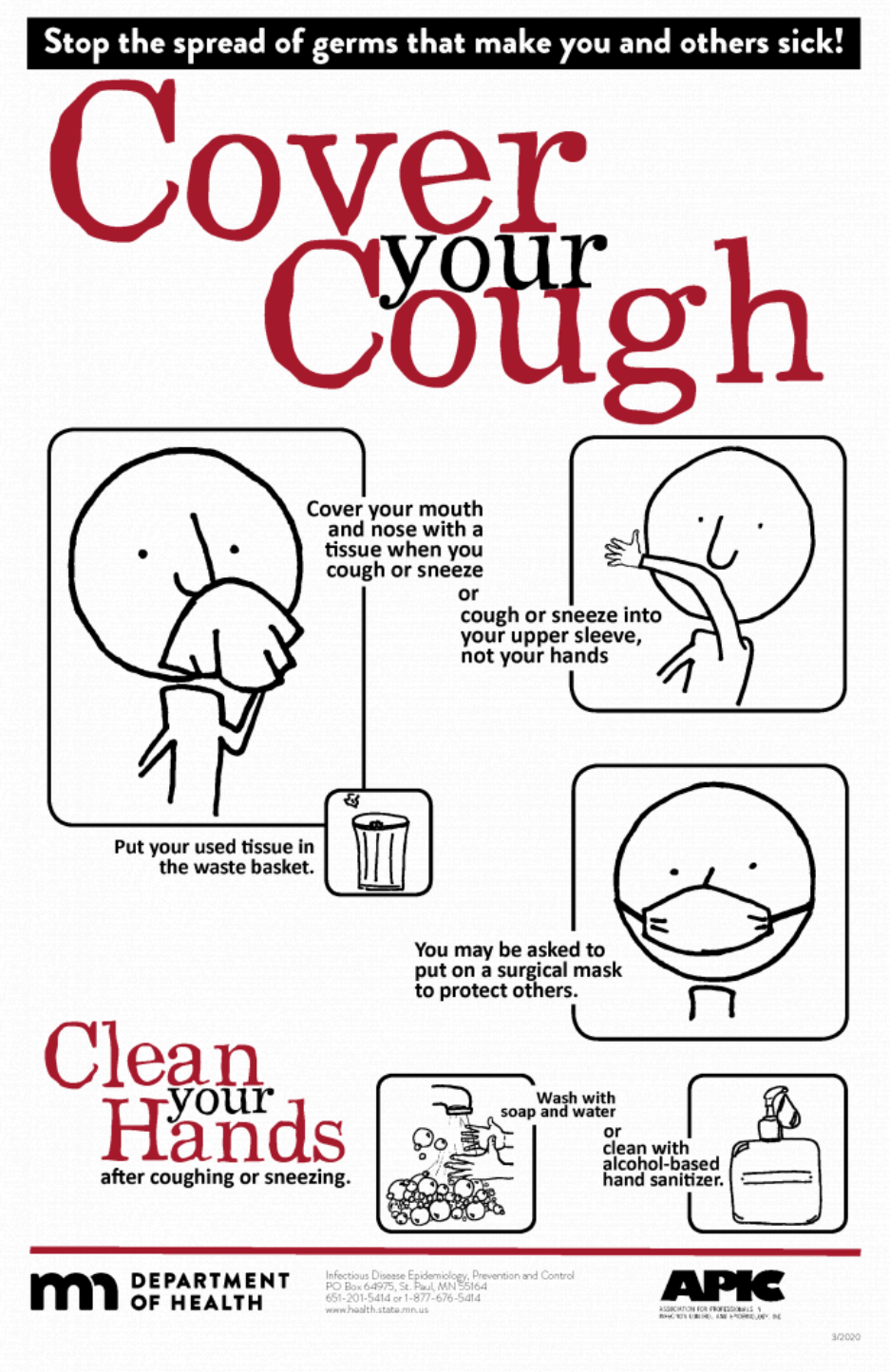

Figure 4.13 Cover Your Cough Poster

Environmental Measures

Routine cleaning and disinfecting surfaces in patient-care areas are part of standard precautions. The cleaning and disinfecting of all patient-care areas are important for frequently touched surfaces, especially those

closest to the patient that are most likely to be contaminated (e.g., bedrails, bedside tables, commodes, doorknobs, sinks, surfaces, and equipment in close proximity to the patient).

Medical equipment and instruments/devices must also be cleaned to prevent patient-to-patient transmission of infectious agents. For example, stethoscopes should be cleaned before and after use for all patients. Patients who have transmission-based precautions should have dedicated medical equipment that remains in their room (e.g., stethoscope, blood pressure cuff, thermometer). When dedicated equipment is not possible, such as a unit-wide bedside blood glucose monitor, disinfection after each patient's use should be performed according to agency policy.[40]

Disposal of Contaminated Waste

Medical waste requires careful disposal according to agency policy. The Occupational Safety and Health Administration (OSHA) has established measures for discarding regulated medical waste items to protect the workers who generate medical waste, as well as those who manage the waste from point of generation to disposal. Contaminated waste is placed in a leak-resistant biohazard bag, securely closed, and placed in a labeled, leakproof, puncture-resistant container in a storage area. Sharps containers are used to dispose of sharp items such as discarded tubes with small amounts of blood, scalpel blades, needles, and syringes.[41]

Sharps Safety

Injuries due to needles and other sharps have been associated with

40. Siegel, J. D., Rhinehart, E., Jackson, M., Chiarello, L., & Healthcare Infection Control Practices Advisory Committee. (2019, July 22). *2007 guideline for isolation precautions: Preventing transmission of infectious agents in healthcare settings*. https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html
41. Centers for Disease Control and Prevention. (2015, November 5). *Background I. Regulated medical waste*. https://www.cdc.gov/infectioncontrol/guidelines/environmental/background/medical-waste.html#i3

transmission of blood-borne pathogens (BBP), including hepatitis B, hepatitis C, and HIV to health care personnel. The prevention of sharps injuries is an essential element of standard precautions and includes measures to handle needles and other sharp devices in a manner that will prevent injury to the user and to others who may encounter the device during or after a procedure. The Bloodborne Pathogens Standard is a regulation that prescribes safeguards to protect workers against health hazards related to blood-borne pathogens. It includes work practice controls, hepatitis B vaccinations, hazard communication and training, plans for when an employee is exposed to a BBP, and recordkeeping.

When performing procedures that include needles or other sharps, dispose of these items immediately in FDA-cleared sharps disposal containers. Additionally, to prevent needlestick injuries, needles and other contaminated sharps should not be recapped. See Figure 4.14[42] for an image of a sharps disposal container. FDA-cleared sharps disposal containers are made from rigid plastic and come marked with a line that indicates when the container should be considered full, which means it's time to dispose of the container. When a sharps disposal container is about three-quarters full, follow agency policy for proper disposal of the container.

If you are stuck by a needle or other sharps or are exposed to blood or other potentially infectious materials in your eyes, nose, mouth, or on broken skin, immediately flood the exposed area with water and clean any wound with soap and water. Report the incident immediately to your instructor or employer and seek immediate medical attention according to agency and school policy.

42. "Sharps-Containers.jpg" by Federal Drug Administration (FDA) is in the Public Domain. Access for free at https://www.fda.gov/medical-devices/safely-using-sharps-needles-and-syringes-home-work-and-travel/sharps-disposal-containers

Figure 4.14 Sharps Disposal Containers

Textiles and Laundry

Soiled textiles, including bedding, towels, and patient or resident clothing may be contaminated with pathogenic microorganisms. However, the risk of disease transmission is negligible if they are handled, transported, and laundered in a safe manner. Follow agency policy for handling soiled laundry using standard precautions. Key principles for handling soiled laundry are as follows:

- Do not shake items or handle them in any way that may aerosolize infectious agents.
- Avoid contact of one's body and personal clothing with the soiled items being handled.
- Place soiled items in a laundry bag or designated bin in the patient's room before transporting to a laundry area. When laundry chutes are used, they must be maintained to minimize dispersion of aerosols from contaminated items.[43]

43. Siegel, J. D., Rhinehart, E., Jackson, M., Chiarello, L., & Healthcare Infection Control Practices Advisory Committee. (2019, July 22). *2007 guideline for isolation precautions: Preventing transmission of infectious agents in healthcare settings*. https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html

4.3 Aseptic Technique

In addition to using standard precautions and transmission-based precautions, **aseptic technique** (also called medical asepsis) is the purposeful reduction of pathogens to prevent the transfer of microorganisms from one person or object to another during a medical procedure. For example, a nurse administering parenteral medication or performing urinary catheterization uses aseptic technique. When performed properly, aseptic technique prevents contamination and transfer of pathogens to the patient from caregiver hands, surfaces, and equipment during routine care or procedures. The word “aseptic” literally means an absence of disease-causing microbes and pathogens. In the clinical setting, aseptic technique refers to the purposeful prevention of microbe contamination from one person or object to another. These potentially infectious, microscopic organisms can be present in the environment, on an instrument, in liquids, on skin surfaces, or within a wound.

There is often misunderstanding between the terms aseptic technique and sterile technique in the health care setting. Both **asepsis** and sterility are closely related, and the shared concept between the two terms is removal of harmful microorganisms that can cause infection. In the most simplistic terms, asepsis is creating a protective barrier from pathogens, whereas **sterile technique** is a purposeful attack on microorganisms. Sterile technique (also called surgical asepsis) seeks to eliminate every potential microorganism in and around a sterile field while also maintaining objects as free from microorganisms as possible. It is the standard of care for surgical procedures, invasive wound management, and central line care. Sterile technique requires a combination of meticulous hand washing, creation of a sterile field, using long-lasting antimicrobial cleansing agents such as betadine, donning sterile gloves, and using sterile devices and instruments.

Principles of Aseptic Non-Touch Technique

Aseptic non-touch technique (ANTT) is the most commonly used aseptic technique framework in the health care setting and is considered a global standard. There are two types of ANTT: surgical-ANTT (sterile technique) and standard-ANTT.

Aseptic non-touch technique starts with a few concepts that must be understood before it can be applied. For all invasive procedures, the "ANTT-approach" identifies key parts and key sites throughout the preparation and implementation of the procedure. A **key part** is any sterile part of equipment used during an aseptic procedure, such as needle hubs, syringe tips, needles, and dressings. A **key site** is any nonintact skin, potential insertion site, or access site used for medical devices connected to the patients. Examples of key sites include open wounds and insertion sites for intravenous (IV) devices and urinary catheters.

ANTT includes four underlying principles to keep in mind while performing invasive procedures:

- **A**lways wash hands effectively.
- **N**ever contaminate key parts.
- **T**ouch non-key parts with confidence.
- **T**ake appropriate infective precautions.

Preparing and Preventing Infections Using Aseptic Technique

When planning for any procedure, careful thought and preparation of many infection control factors must be considered beforehand. While keeping standard precautions in mind, identify anticipated key sites and key parts to the procedure. Consider the degree to which the environment must be managed to reduce the risk of infection, including the expected degree of contamination and hazardous exposure to the clinician. Finally, review the expected equipment needed to perform the procedure and

the level of key part or key site handling. See Table 4.3 for an outline of infection control measures when performing a procedure.

Table 4.3 Infection Control Measures When Performing Procedures

Infection Control Measure	Key Considerations	Examples
Environmental control	• Recognize and avoid risks in the environment that may increase risk of infection.	• Ensure clean bed linens. • Monitor patient lines that are near or across work areas. • Clean surfaces before establishing a work area. • Keep food and personal items away from working areas.
Hand hygiene	• Perform hand hygiene frequently and during key moments. (Review the Five Key Moments under the "Appropriate Hand Hygiene" section.)	• Scrub with soap solution and water for 20-30 seconds. • Use alcohol-based rub until dry, unless hands are visibly soiled or the patient has C-diff.

Personal protective equipment (PPE)	• Select sterile or clean gloves based on the need to touch key parts or key sites directly. • Gloves do not replace the need for hand hygiene.	• Gloves (sterile or clean, based on the procedure) • Mask or respirator • Protective eyewear, goggles, or face shield • Gown (sterile or clean, whichever is appropriate)
Aseptic field management	Determine level of aseptic field needed and how it will be managed before the procedure begins: • **General aseptic field**: Key parts and sites are easily protected. Sterile field does not need to be set up and managed as a key part. • **Critical aseptic field**: Key parts and sites are large, numerous, or not easily protected using non-touch technique. Sterile field needs to be established before and managed during procedure.	General aseptic field: IV irrigation Dry dressing changes Critical aseptic field: Urinary catheter placement Central line dressing change Sterile dressing change

Non-touch technique	• Non-touch is the primary goal, even when sterile gloves are used. • Requires preparation and knowledge of planned procedure sequencing. • Touching key sites and key parts is limited, purposeful, and only when needed.	• Handling key parts only at the time needed to assemble or use in procedure • Handling syringes away from the hub • Applying bandages by the edges away from key parts that will contact key sites
Sequencing	• Order of procedure requires planning to be efficient, logical, and safe. • Practicing guidelines give direction as to optimal order from preparation to completion.	• Generally, follow "clean to dirty" standards, working from least to most contaminated key parts and sites.

Use of Gloves and Sterile Gloves

There are two different levels of medical-grade gloves available to health care providers: clean (exam) gloves and sterile (surgical) gloves. Generally speaking, clean gloves are used whenever there is a risk of contact with body fluids or contaminated surfaces or objects. Examples include starting an intravenous access device or emptying a urinary catheter collection bag. Alternatively, sterile gloves meet FDA requirements for sterilization and are used for invasive procedures or when contact with a sterile site,

tissue, or body cavity is anticipated. Sterile gloves are used in these instances to prevent transient flora and reduce resident flora contamination during a procedure, thus preventing the introduction of pathogens. For example, sterile gloves are required when performing central line dressing changes, insertion of urinary catheters, and during invasive surgical procedures. See Figure 4.15[1] for images of a nurse opening and removing sterile gloves from packaging.

See the "Checklist for Applying and Removing Sterile Gloves" for details on how to apply sterile gloves.

Applying Sterile Gloves on YouTube[2]

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://wtcs.pressbooks.pub/nursingskills/?p=1564#oembed-1

1. "Book-pictures-2015-199-001-300x241.jpg," "Book-pictures-2015-215.jpg," and "Book-pictures-2015-219.jpg" by British Columbia Institute of Technology are licensed under CC BY 4.0. Access for free at https://opentextbc.ca/clinicalskills/chapter/sterile-gloving/
2. RegisteredNurseRN. (2017, April 28). *Sterile gloving nursing technique | Don/donning sterile gloves tips.* [Video]. YouTube. All rights reserved. Video used with permission. https://youtu.be/lumZOF-METc

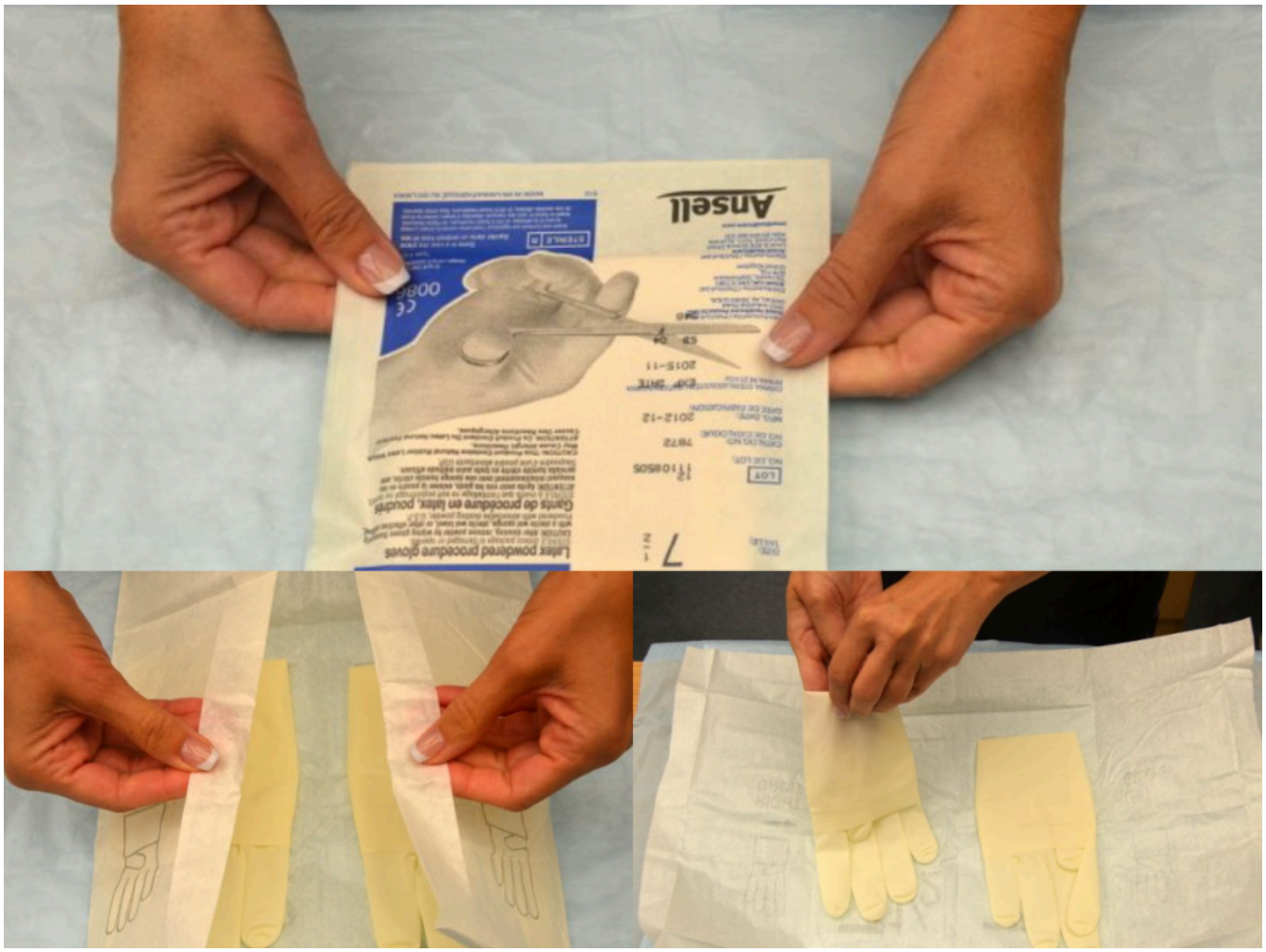

Figure 4.15 Sterile Gloves

4.4 Sterile Fields

A sterile field is established whenever a patient's skin is intentionally punctured or incised, during procedures involving entry into a body cavity, or when contact with nonintact skin is possible (e.g., surgery or trauma). Surgical asepsis requires adherence to strict principles and intentional actions to prevent contamination and to maintain the sterility of specific parts of a sterile field during invasive procedures. Creating and maintaining a sterile field is foundational to aseptic technique and encompasses practice standards that are performed immediately prior to and during a procedure to reduce the risk of infection, including the following:

- Handwashing
- Using sterile barriers, including drapes and appropriate personal protective equipment
- Preparing the patient using an approved antimicrobial product
- Maintaining a sterile field
- Using aseptically safe techniques

There are basic principles of asepsis that are critical to understand and follow when creating and maintaining a sterile field. The most basic principle is to allow only sterile supplies within the sterile field once it is established. This means that prior to using any supplies, exterior packaging must be checked for any signs of damage, such as previous exposure to moisture, holes, or tears. Packages should not be used if they are expired or if sterilization indicators are not the appropriate color. Sterile contents inside packages are dispensed onto the sterile field using the methods outlined below. See Figure 4.16[1] for an image of a nurse dispensing sterile supplies from packaging onto an established sterile field.

1. "DSC_0319-1024x678.jpg" by British Columbia Institute of Technology is licensed under CC BY 4.0. Access for free at https://opentextbc.ca/clinicalskills/chapter/sterile-gloving/

Figure 4.16 Dispensing Sterile Supplies onto a Sterile Field

When establishing and maintaining a sterile field, there are other important principles to strictly follow:

- Disinfect any work surfaces and allow to them thoroughly dry before placing any sterile supplies on the surface.
- Be aware of areas of sterile fields that are considered contaminated:
    - Any part of the field within 1 inch from the edge.
    - Any part of the field that extends below the planar surface (i.e., a drape hanging down below the tray tabletop).
    - Any part of the field below waist level or above shoulder level.
    - Any supplies or field that you have not directly monitored (i.e., turned away from the sterile field or walked out of the room).
    - Within 1 inch of any visible holes, tears, or moisture wicked from

an unsterile area.

- When handling sterile kits and trays:
  - Sterile kits and trays generally have an outer protective wrapper and four inner flaps that must be opened aseptically.
  - Open sterile kits away from your body first, touching only the very edge of the opening flap.
  - Using the same technique, open each of the side flaps one at a time using only one hand, being careful not to allow your body or arms to be directly above the opened drape. Take care not to allow already-opened corners to flip back into the sterile area again.
  - Open the final flap toward you, being careful to not allow any part of your body to be directly over the field. See Figure 4.17[2] for images of opening the flaps of a sterile kit.
  - If you must remove parts of the sterile kit (i.e., sterile gloves), reach into the sterile field with the elbow raised, using only the tips of the fingers before extracting. Pay close attention to where your body and clothing are in relationship to the sterile field to avoid inadvertent contamination.

2. "Book-pictures-2015-700.jpg," "Book-pictures-2015-706.jpg," "Book-pictures-2015-708.jpg," and "Book-pictures-2015-709.jpg" by British Columbia Institute of Technology are licensed under CC BY 4.0. Access for free at https://opentextbc.ca/clinicalskills/chapter/sterile-gloving/

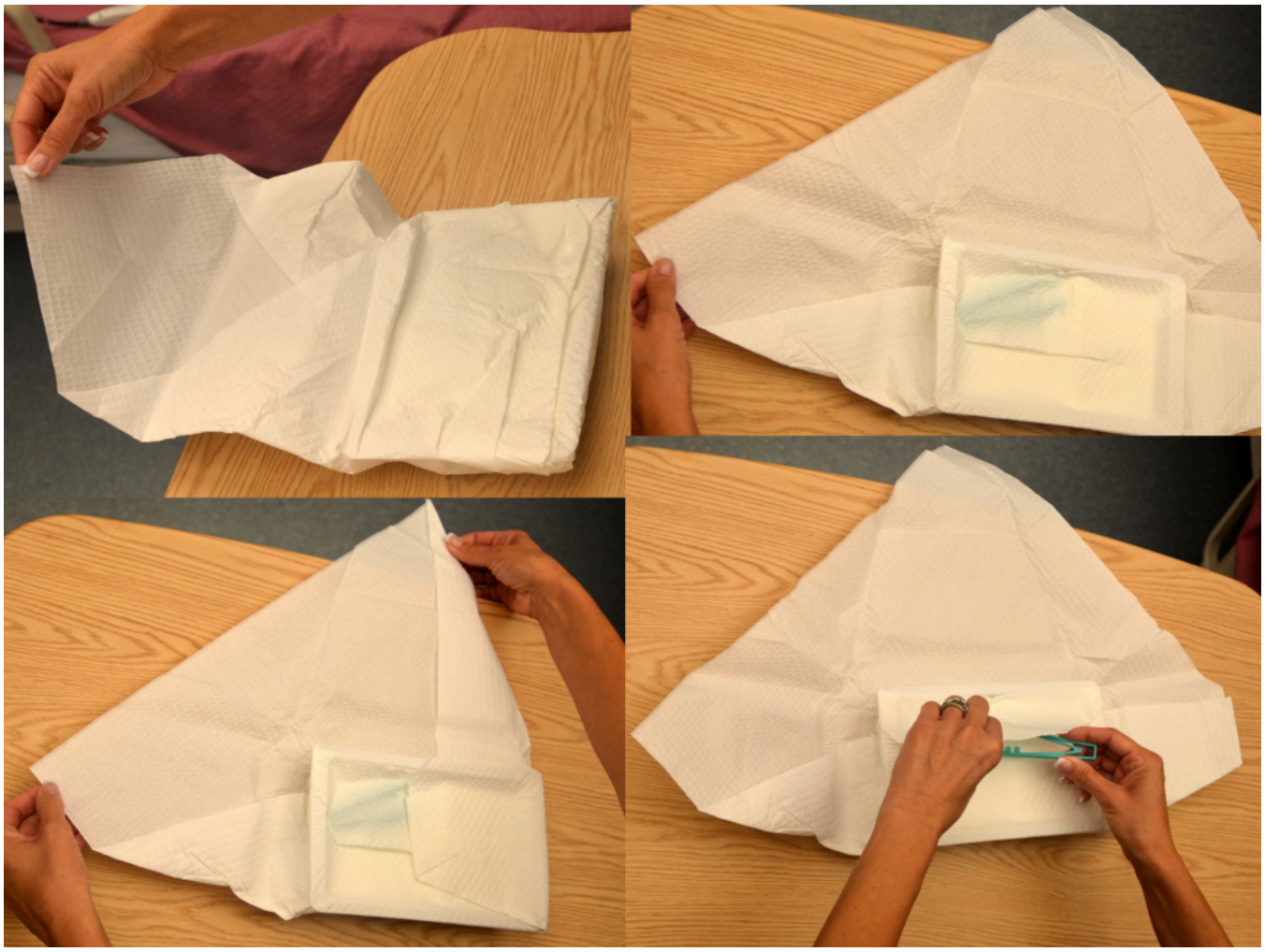

Figure 4.17 Opening a Sterile Kit

- When dispensing sterile supplies onto a sterile field:
    - Before dispensing sterile supplies to a sterile field, do not allow sterile items to touch any part of the outer packaging once it is opened, including the former package seal.
    - Heavy or irregular items should be opened and held, allowing a second person with sterile gloves to transfer them to the sterile field.
    - Wrapped sterile items should be opened similarly to a sterile kit. Tuck each flap securely within your palm, and then open the flap away from your body first. Then open each side flap; secure the flap in the palm one at a time and open. Finally, open the flap (closest to you) toward you, while also protecting the other

opened flaps from springing back onto the wrapped item.
- Peel pouches (i.e., gloves, gauze, syringes, etc.) can be opened by firmly grasping each side of the sealed edge with the thumb side of each hand parallel to the seal and pulling carefully apart.
- Drop items from six inches away from the sterile field.
- Sterile solutions should be poured into a sterile bowl or tray from the side of the sterile field and not directly over it. Use only sealed, sterile, unexpired solutions when pouring onto a sterile field. Solution should be held six inches away from the field as it is being poured. Avoid splashing solutions because this allows wicking and transfer of microbes. After pouring of solution stops, it should not be restarted because the edge is considered contaminated. See Figure 4.18[3] of an image of a nurse pouring sterile solution into a receptacle in a sterile field before the procedure begins.
- Don sterile gloves away from the sterile field to avoid contaminating the sterile field.

3. "DSC_0313.jpg" by British Columbia Institute of Technology is licensed under CC BY 4.0. Access for free at https://opentextbc.ca/clinicalskills/chapter/sterile-gloving/

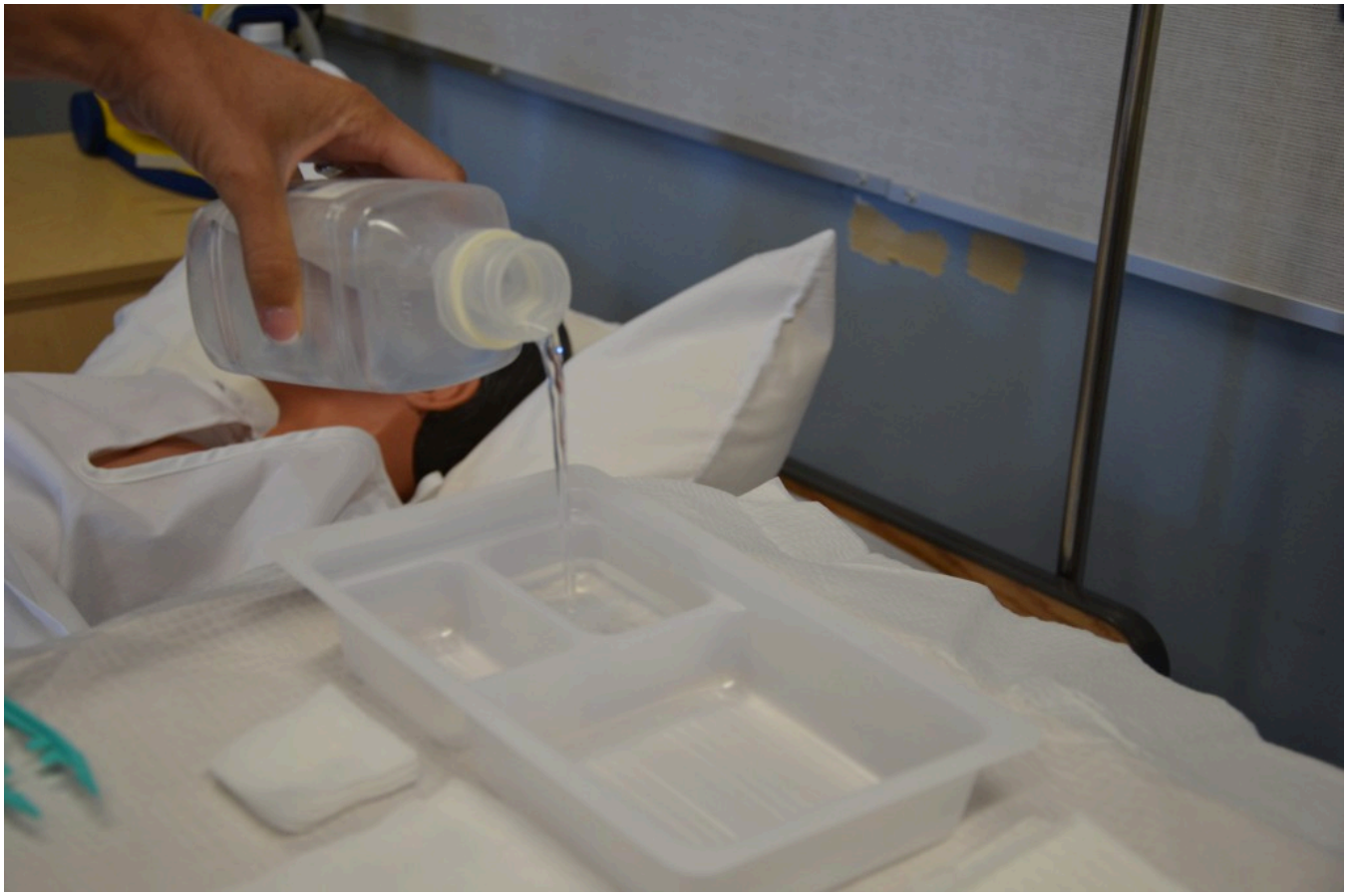

Figure 4.18 Pouring Sterile Solution

4.5 Checklist for Hand Hygiene With Soap and Water

Use the checklist below to review the steps for completion of “Hand Hygiene With Soap and Water.”

Steps

Disclaimer: Always review and follow agency policy regarding this specific skill.

1. Remove jewelry according to agency policy; push your sleeves above your wrists.
2. Turn on the water and adjust the flow so that the water is warm. Wet your hands thoroughly, keeping your hands and forearms lower than your elbows. Avoid splashing water on your uniform.
3. Apply a palm-sized amount of hand soap.
4. Perform hand hygiene using plenty of lather and friction for at least 15 seconds:

    - Rub hands palm to palm
    - Back of right and left hand (fingers interlaced)
    - Palm to palm with fingers interlaced
    - Rotational rubbing of left and right thumbs
    - Rub your fingertips against the palm of your opposite hand
    - Rub wrists
    - Repeat sequence at least 2 times
    - Keep fingertips pointing downward throughout

5. Clean under your fingernails with disposable nail cleaner (if applicable).
6. Wash for a minimum of 20 seconds.
7. Keep your hands and forearms lower than your elbows during the entire washing.
8. Rinse your hands with water, keeping your fingertips pointing down

so water runs off your fingertips. Do not shake water from your hands.

9. Do not lean against the sink or touch the inside of the sink during the hand-washing process.
10. Dry your hands thoroughly from your fingers to wrists with a paper towel or air dryer.
11. Dispose of the paper towel(s).
12. Use a new paper towel to turn off the water.
13. Dispose of the paper towel.

4.6 Checklist for Hand Hygiene With Alcohol-Based Hand Sanitizer

Use the checklist below to review the steps for completion of “Hand Hygiene With Alcohol-Based Hand Sanitizer.”

Steps

Disclaimer: Always review and follow agency policy regarding this specific skill.

1. Gather supplies (antiseptic hand rub).
2. Remove jewelry according to agency policy; push your sleeves above your wrists.
3. Apply enough product into the palm of one hand and enough to cover your hands thoroughly, per product directions.
4. Rub your hands together, covering all surfaces of your hands and fingers with antiseptic until the alcohol is dry (a minimum of 20-30 seconds):

    - Rub hands palm to palm
    - Back of right and left hand (fingers interlaced)
    - Palm to palm with fingers interlaced
    - Rotational rubbing of left and right thumbs
    - Rub your fingertips against the palm of your opposite hand
    - Rub your wrists

5. Repeat hand sanitizing sequence a minimum of two times.
6. Repeat hand sanitizing sequence until the product is dry.

4.7 Checklist for Personal Protective Equipment (PPE)

Use the checklist below to review the steps for completion of "Applying and Removing Personal Protective Equipment."[1]

Steps

Disclaimer: Always review and follow agency policy regarding this specific skill.

1. Check the provider's order for the type of precautions.
2. Ensure that all supplies are available before check-off begins: isolation cart, gowns, gloves, mask, goggles/face shields, etc.
3. Perform hand hygiene.
4. Apply PPE in the correct order:

    - 1st (GOWN): Gown should cover outer garments. Pull the sleeves down to the wrists, and tie at neck & waist.
    - 2nd (MASK/RESPIRATOR): Apply surgical mask or N95 respirator if indicated by transmission-based precaution. Fit the mask around the nose and chin, securing bands around ears or tie straps at top of head and base of neck.
    - 3rd (EYE PROTECTION): Apply goggles/face shield if indicated for patient condition or transmission-based precautions.
    - 4th (CLEAN GLOVES): Pull on gloves to cover the wrist of the gown.

5. Remove PPE in the correct order:

    - 1st REMOVE GLOVES: REMEMBER: GLOVE TO GLOVE; SKIN TO SKIN. Do not touch contaminated gloves to your skin. Take off the

1. Centers for Disease Control and Prevention. (2020, August 19). *Using personal protective equipment (PPE)*. https://www.cdc.gov/coronavirus/2019-ncov/hcp/using-ppe.html

contaminated glove with your gloved hand, wrapping the contaminated glove in the palm of your gloved hand. Take off the glove with your bare hand to the skin of your wrist, moving inside of the glove to remove the contaminated glove inside out over the other glove. Note: If the gown is tied in front, untie it prior to removing your glove.

- 2nd REMOVE GOWN: Untie all ties (or unsnap all buttons). Some gown ties can be broken rather than untied. Do so in a gentle manner, avoiding a forceful movement. Reach up to the shoulders and carefully pull the gown down and away from the body. Rolling the gown down is an acceptable approach. Dispose in trash receptacle.
- 3rd PERFORM HAND HYGIENE.
- 4th REMOVE FACE SHIELD or GOGGLES: Carefully remove face shield or goggles by grabbing the strap and pulling upwards and away from head. Do not touch the front of face shield or goggles.
- 5th REMOVE MASK or RESPIRATOR: Do not touch the front of the face shield or goggles.
    - Respirator: Remove the bottom strap by touching only the strap and bringing it carefully over the head. Grasp the top strap and bring it carefully over the head, and then pull the respirator away from the face without touching the front of the respirator.
    - Face mask: Carefully untie (or unhook from the ears) and pull it away from the face without touching the front.
- 6th PERFORM HAND HYGIENE after removing the mask.

4.8 Checklist for Applying and Removing Sterile Gloves

Use the checklist below to review the steps for completion of “Applying and Removing Sterile Gloves.”

View an instructor demonstration YouTube video on applying sterile gloves.[1]:

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://wtcs.pressbooks.pub/nursingskills/?p=4830#oembed-1

Steps

Disclaimer: Always review and follow agency policy regarding this specific skill.

1. Gather the supplies: hand sanitizer and sterile gloves.
2. Perform hand hygiene.
3. Open the sterile gloves on a dry, flat, clean work surface.
4. Remove the outer package by separating and peeling apart the sides of the package.
5. Grasp the inner package and lay it on a clean, dry, flat surface at waist level.
6. Open the top flap away from your body; open the bottom flap toward your body.
7. Open the side flaps without contaminating the inside of the wrapper or allowing it to close.
8. With your nondominant hand, use your thumb and index finger to only grasp the inside surface of the cuff of the glove for your dominant

1. Open RN Project. (2021, November 11). *Applying sterile gloves* [Video]. YouTube. Video licensed under CC-BY-4.0. https://youtu.be/xj8EAjJGn98

hand.

9. Lift out the glove, being careful to not touch any surfaces and holding the glove no more than 12-18" above the table without contaminating the sterile glove; carefully pull the glove over your hand.
10. Use your nondominant, nonsterile hand to grasp the flap of the package, and hold the package steady. With the sterile glove on your dominant hand, hold 4 fingers together of the gloved hand to reach in the outer surface of the cuff of the sterile glove, reaching under the folded cuff and with the thumb outstretched to not touch the second sterile glove. Lift the glove off the package without breaking sterility.
11. While holding the fingers of the nondominant hand outstretched and close together, tuck your thumb into the palm, and use the sterile dominant hand to pull the second sterile glove over the fingers of the nondominant hand.
12. After the second sterile glove is on, interlock the fingers of your sterile gloved hands, being careful to keep your hands above your waist.
13. Do not touch the inside of the package or the sterile part of the gloves with your bare hands during the process.
14. Maintain sterility throughout the procedure of donning sterile gloves.

Removing Sterile Gloves

1. Grasp the outside of one cuff with the other gloved hand. Avoid touching your skin.
2. Pull the glove off, turning it inside out and gather it in the palm of the gloved hand.
3. Tuck the index finger of your bare hand inside the remaining glove cuff and peel the glove off inside out and over the previously removed glove.
4. Dispose of contaminated wastes appropriately.
5. Perform hand hygiene.

Learning Activities

(Answers to "Learning Activities" can be found in the "Answer Key" at the end of the book. Answers to interactive activity elements will be provided within the element as immediate feedback.)

You are caring for an elderly male patient who is experiencing urinary retention. The provider has just ordered an intermittent catheterization for the patient based on the results of a recent bladder scan of 375 mL. You gather the equipment and enter the patient's room. **Based on the five moments of hand hygiene, describe the instances in which you will sanitize your hands when working with the patient and performing the intermittent catheterization.**

Based upon the information provided, which clinical scenarios require the use of soap and water (versus alcohol-based hand scrubs) for proper hand sanitization?

a. Entry into patient's room with no contact precautions
b. Patient on *Clostridium Difficile* (C-Diff) contact precautions
c. Prior to Foley catheter insertion for a patient with no contact precautions
d. Hands are visibly soiled

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://wtcs.pressbooks.pub/nursingskills/?p=1570#h5p-147

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://wtcs.pressbooks.pub/nursingskills/?p=1570#h5p-39

Test your clinical judgment with an NCLEX Next Generation-style question: Chapter 4, Assignment 1.

Test your clinical judgment with an NCLEX Next Generation-style question: Chapter 4, Assignment 2.

- Test your clinical judgment with an NCLEX Next Generation-style question: Chapter 4, Assignment 3.

IV Glossary

Airborne precautions: Infection prevention and control interventions to be used in addition to standard precautions for diseases spread by airborne transmission, such as measles and tuberculosis.

Asepsis: A state of being free of disease-causing microorganisms.

Aseptic non-touch technique: A standardized technique, supported by evidence, to maintain asepsis and standardize practice.

Aseptic technique (medical asepsis): The purposeful reduction of pathogen numbers while preventing microorganism transfer from one person or object to another. This technique is commonly used to perform invasive procedures, such as IV starts or urinary catheterization.

Contact precautions: Infection prevention and control interventions to be used, in addition to standard precautions, for diseases spread by contact with the patient, their body fluids, or their surroundings, such as C-diff, MRSA, VRE, and RSV.

Doff: To take off or remove personal protective equipment, such as gloves or a gown.

Don: To put on equipment for personal protection, such as gloves or a gown.

Droplet precautions: Infection prevention and control interventions to be used in addition to standard precautions; used for diseases spread by large respiratory droplets such as influenza, COVID-19, or pertussis.

Enhanced Barrier Precautions: An infection control intervention designed to reduce transmission of multidrug-resistant organisms (MDRO'S) in nursing homes.

Five moments of hand hygiene: Hand hygiene should be performed during the five moments of patient care: immediately before touching a

patient; before performing an aseptic task or handling invasive devices; before moving from a soiled body site to a clean body site on a patient; after touching a patient or their immediate environment; after contact with blood, body fluids, or contaminated surfaces (with or without glove use); and immediately after glove removal.

Hand hygiene: A way of cleaning one's hands to substantially reduce the number of pathogens and other contaminants (e.g., dirt, body fluids, chemicals, or other unwanted substances) to prevent disease transmission or integumentary harm, typically using soap, water, and friction. An alcohol-based hand rub solution may be appropriate hand hygiene for hands not visibly soiled.

Healthcare-Associated Infections (HAIs): Unintended infections caused by care received in a health care setting.

Key part: Any sterile part of equipment used during an aseptic procedure, such as needle hubs, syringe tips, dressings, etc.

Key site: The site contacted during an aseptic procedure, such as nonintact skin, a potential insertion site, or an access site used for medical devices connected to the patients. Examples of key sites include the insertion or access site for intravenous (IV) devices, urinary catheters, and open wounds.

Personal Protective Equipment (PPE): Personal protective equipment, such as gloves, gowns, face shields, goggles, and masks, used to prevent transmission of disease from patient to patient, patient to health care provider, and health care provider to patient.

Standard precautions: The minimum infection prevention practices that apply to all patient care, regardless of suspected or confirmed infection status of the patient, in any setting where health care is delivered.

Sterile technique (surgical asepsis): Techniques used to eliminate every potential microorganism in and around a sterile field while maintaining

objects and areas as free from microorganisms as possible. This technique is the standard of care for surgical procedures, invasive wound management, and central line care.

PART V

CHAPTER 5 MATH CALCULATIONS

5.1 Math Calculations Introduction

Learning Objectives

- Accurately perform calculations using decimals, fractions, percentages, ratios, and/or proportions
- Convert between the metric and household systems
- Use military time
- Use dimensional analysis
- Accurately solve calculations related to conversions, dosages, liquid concentrations, reconstituted medications, weight-based medications, and intravenous infusions and evaluate final answer to ensure safe medication administration

The Institute of Medicine (IOM) has estimated that the average hospitalized patient experiences at least one medication error each day. Nurses are the last step in the medication administration process before the medication reaches the patient, so they bear the final responsibility to ensure the medication is safe. To safely prepare and administer medications, the nurse performs a variety of mathematical calculations, such as determining the number of tablets, calculating the amount of solution, and setting the rate of an intravenous infusion.[1]

Dosage calculation in clinical practice is more than just solving a math problem. Nurses must perform several tasks during drug calculations,

1. Institute of Medicine. (2007). *Preventing medication errors*. The National Academies Press. https://doi.org/10.17226/11623

such as reading drug labels for pertinent information, determining what information is needed to set up the math calculation, performing the math calculations, and then critically evaluating the answer to determine if it is within a safe dosage range for that specific patient. Finally, the nurse selects an appropriate measurement device to accurately measure the calculated dose or set the rate of administration.[2] This chapter will explain how to perform these tasks related to dosage calculations using authentic problems that a nurse commonly encounters in practice.

2. Ozimek, D. (2019). *Teaching dosage calculations: Strategies for narrowing the theory-practice gap* [Webinar]. The University of Texas at Austin Charles A. Dana Center. https://www.utdanacenter.org/our-work/higher-education/collaborations/math-for-nurses

Measuring Devices

Depending on the type and amount of medication that is being administered, there are several devices used for measuring and administering medications.

A **medication cup** that is composed of plastic or paper is used to hold and dispense oral medications to a patient. A paper cup is used to administer nonliquid medications, such as tablets or capsules. A plastic medication cup is used to dispense both liquid and nonliquid medications, and calibrated cups are also used to measure liquid medications prior to administration. Calibrated medication cups have labelled measurements such as ounces (oz), cubic centimeters (cc), milliliters (mL), teaspoons (tsp), and tablespoons (Tbs). See Figure 5.1[1] for an image of a calibrated medication cup.

Figure 5.1 Calibrated Medication Cups

Oral syringes are used to administer liquid medications via the oral route,

1. "Medication Cups" by Deanna Hoyord, Chippewa Valley Technical College is licensed under CC BY 4.0

especially to children, because they allow for precise measurement of small doses. See Figure 5.2[2] for an image of an oral syringe. Oral syringes have different tips than syringes used for injections.

Figure 5.2 Oral Syringes

Syringes are used when administering medications through the parenteral route (i.e., intradermally, subcutaneously, intramuscularly, or intravenously). There are also syringes specifically developed for oral medication administration. Oral medication syringes are commonly orange in color and have a tip that will not allow the oral syringe to be connected to an intravenous injection port. Syringes used for injections are available in many sizes and are selected by the nurse based on the

2. "Oral Syringes 3I3A0820.jpg" by Deanna Hoyord, Chippewa Valley Technical College is licensed under CC BY 4.0

type of injection and the type of medication administered. Both Luer lock and slip tip syringes are commonly available for parenteral use. Luer lock syringes have a threaded syringe tip that allow the syringes to be screwed into an injection port. Slip tip syringes do not have a locking mechanism or screw-on connection. Slip tip syringes can be easily attached and removed from different injection devices. Many slip tip syringes are found in Foley catheter insertion kits. Common syringe sizes range from 1 mL to 60 mL. See Figure 5.3[3] for an image comparing various sizes of syringes. Syringes are calibrated based on the volume they hold. For example, a 1-mL syringe is calibrated in hundredths, and a 3-mL syringe is calibrated in tenths. Syringes that hold larger volumes, such as 5-, 10-, and 12-mL syringes, are usually calibrated in fifths (two tenths). Large syringes, such as 60-mL syringes, are calibrated in whole numbers.

3. "Syringes 3I3A0446.jpg" by Deanna Hoyord, Chippewa Valley Technical College is licensed under CC BY 4.0

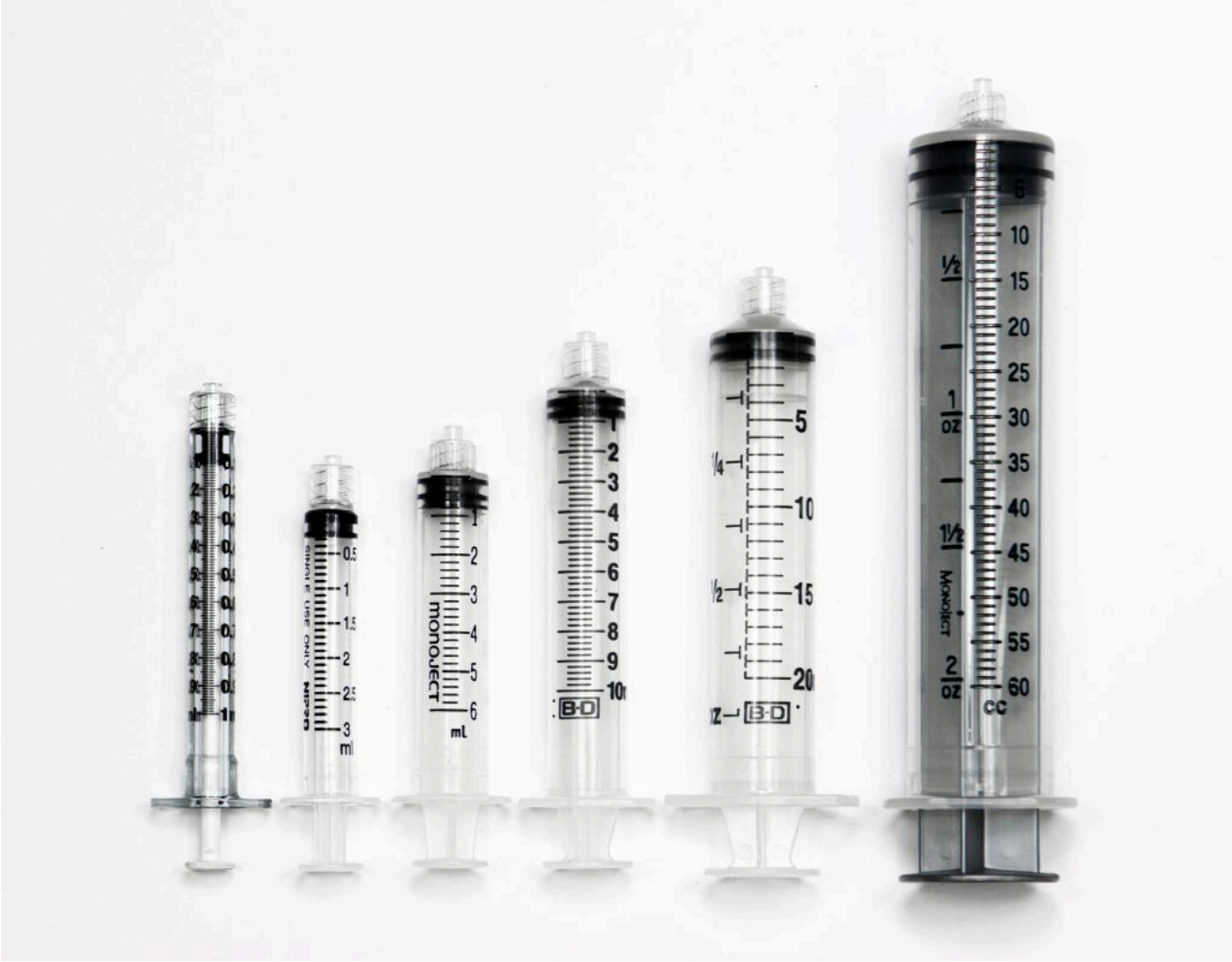

Figure 5.3 Various Sizes of Syringes

Special syringes are used to administer insulin and are calibrated in units. See Figure 5.4[4] for an image of an insulin syringe. Insulin syringes are easily identified by a standard orange cap.

4. "Insulin Syringe 3I3A0783.jpg" by Deanna Hoyord, Chippewa Valley Technical College is licensed under CC BY 4.0

Figure 5.4 Insulin Syringe

5.3 Military Time

Military time is a method of measuring the time based on the full 24 hours of the day rather than two groups of 12 hours indicated by AM and PM. It is also referred to as using a 24-hour clock. Using military time is the standard method used to indicate time for medication administration. The use of military time reduces potential confusion that may be caused by using AM and PM and also avoids potential duplication when giving scheduled medications. For example, instead of stating medication is due at 7 AM and 7 PM, it is documented on the medication administration record (MAR) as due at 0700 and 1900. See Figure 5.5[1] for an example clock and Table 5.3 for a military time conversion chart.

Figure 5.5 Military Time Clock

- Conversion of an AM time to military time simply involves removing the colon and adding a zero to the time. For example, 6:30 AM becomes 0630.
- Conversion of a PM time to military time involves removing the colon

1. "Military Time Clock 3I3A0711.jpg" by Deanna Hoyord, Chippewa Valley Technical College is licensed under CC BY 4.0

and adding 1200 to the time. For example, 7:15 PM becomes 1915.

Table 5.3 Military Time Conversion Chart

Normal Time	Military Time	Normal Time	Military Time
12:00 AM	0000	12:00 PM	1200
1:00 AM	0100	1:00 PM	1300
2:00 AM	0200	2:00 PM	1400
3:00 AM	0300	3:00 PM	1500
4:00 AM	0400	4:00 PM	1600
5:00 AM	0500	5:00 PM	1700
6:00 AM	0600	6:00 PM	1800
7:00 AM	0700	7:00 PM	1900
8:00 AM	0800	8:00 PM	2000
9:00 AM	0900	9:00 PM	2100
10:00 AM	1000	10:00 PM	2200
11:00 AM	1100	11:00 PM	2300

Practice Problems: Military Time

Practice converting military time using the following problems. *The answers are found in the Answer Key (Math Calculations Chapter section) at the end of the book.*

1. A patient has a medication scheduled for 1930. What time does this indicate? Include AM or PM.
2. As you prepare to administer a PRN dose of pain medication, you notice the previous dose was administered at 0030. What time does this indicate? Include AM or PM.
3. You administer medication to a patient at 9 AM. How should this be documented in military time?

4. You administer medication to a patent at 10 PM. How should this be documented in military time?