

Glynda Doyle, Jodie McCutcheon

# Clinical Procedures for Safer Patient Care



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Glynda Rees Doyle and Jodie Anita McCutcheon

BCCAMPUS  
VICTORIA, B.C.



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## About BCcampus Open Education

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[BCcampus Open Education](#) began in 2012 as the B.C. Open Textbook Project with the goal of making post-secondary education in British Columbia more accessible by reducing students' costs through the use of open textbooks and other OER. [BCcampus](#) supports the post-secondary institutions of British Columbia as they adapt and evolve their teaching and learning practices to enable powerful learning opportunities for the students of B.C. BCcampus Open Education is funded by the [British Columbia Ministry of Advanced Education and Skills Training](#) and the [Hewlett Foundation](#).

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## Introduction

In Canada, there continues to be overwhelming evidence that significant preventable harm and patient care errors continue to occur despite the fact that most health care providers are committed to providing safe patient care and to do no harm (Baker et al., 2004; Butt, 2010). Health care-associated errors or near misses are rarely the result of poor motivation, negligence, or incompetence, but are based on key contributing factors such as poor communications, less than optimal teamwork, memory overload, reliance on memory for complex procedures, and the lack of standardization in policies and procedures in health care (Canadian Patient Safety Institute, 2011). In addition, patient care errors are rarely the result of just one person's mistake, but, instead, often reflect predictable human failings in the context of poorly designed systems. Despite current research into human factors as direct contributors to patient care errors, many of our complex medical procedures are based on perfect memory, even though we humans are prone to short-term memory loss (Frank, Hughes, & Brian, 2008).

In health care education, students must have the knowledge, skills, attitudes, and experience to be able to anticipate, identify, and manage situations that place patients at risk. To become competent in clinical skills, students practise in the classroom and laboratory, and then apply what they have learned to practise with supervision and support in the clinical setting. However, students today are often faced with less than optimal clinical exposure and assessment to develop the expertise and experience they need to be fully competent by graduation. Furthermore, interprofessional teamwork creates shared patient care environments, where many disciplines will care for patients and their conditions, and patient information and care management moves frequently among health care providers. Successful patient treatment is reliant on many different health care providers and their skill sets, and each discipline teaches clinical skills differently. The lack of consistency in training and in the use of the latest evidence-based research in health care education makes it challenging to ensure safe care.

These issues contribute to unsafe care and preventable medical errors. In the delivery of health care and professional health care practice, it is no longer acceptable that preventable errors continue to take place in modern-day health care. Health care providers need a method to improve patient care, and standardization of processes and approaches, such as is provided by practice guidelines and checklists, will contribute to the development of safer patient care (Canadian Nurses Association, 2004).

In reviewing incidents and preventable errors, significant factors, including human factors, have been identified, and strategies have been introduced to reduce the likelihood of errors and to create a safe standard of care. The creation of guidelines for the execution of processes will not change culture, but can encourage us to find a level of practice that contributes to standardizing safe care and helps us deal with our human failings as we try to always perform perfectly in a complex environment. Change should be focused on creating robust safety systems. Among these, the point-of-care checklist has been proven to be a safe strategy, and is now becoming more common in health care (Frank, Hughes, & Brien, 2008).

## USE OF CHECKLISTS

Checklists are the predominant format used in this resource, following the work of Dr. Atul Gawande, described in his book *The Checklist Manifesto: How to Get Things Right* (2010). Dr. Gawande believes that although the modern world has given us knowledge and experience, avoidable medical errors continue to occur. Dr. Gawande posits that the reason for this is simple: the volume and complexity of health care today has exceeded our ability as individuals to properly deliver it when caring for people consistently, correctly, and safely. He argues that we can do better by using the simplest of methods: the checklist. The most often-cited example of Dr. Gawande's work is a simple surgical checklist from the World Health Organization that has been adopted in more than 20 countries as a standard of care and has been heralded as "the biggest clinical invention in thirty years" (*The Independent*, cited in Gawande, 2010). Just one example of its success comes from the United States: when the State of Michigan began using a checklist for central lines in its intensive care units, the infection rate dropped 66% in three months. In 18 months, the checklist saved an estimated \$175 million and 1,500 lives (Shulz, 2010). Checklists allow for complex pathways of care to function with high reliability by giving the users an opportunity to review their actions individually and with others, and to proceed in a logical, safe manner.

This open educational resource (OER) was developed to ensure best practice and quality care based on the latest evidence, and to address inconsistencies in how clinical health care skills are taught and practised in the clinical setting. The checklist approach aims to provide standardized processes for clinical skills and to help nursing schools and clinical practice partners keep procedural practice current.

## HOW TO USE THIS BOOK

This book should be used in conjunction with existing courses in any health care program. This book is not intended to replace core resources in health care programs that provide comprehensive information concerning diseases and conditions. An understanding of medical terminology, human anatomy, physiology, and pathophysiology is a required asset to use this book effectively. The development of technical skills is based on the knowledge of, practice to achieve proficiency in, and attitudes related to the skill, and an awareness of how our roles affect our patients and other health care professionals. This book contributes to enhancing safer care for patients by outlining evidence-based practices, and looking beyond just the technical skill to understanding the types of expertise and knowledge required to decrease adverse events. In each of the 88 checklists throughout this book (and summarized in [Appendix 2](#)), rationale for each step is provided in the form of *Additional Information*.

Each skill/procedure is covered in a chapter that has learning objectives, a brief overview of the relevant theory, checklists of steps for procedures with the rationale behind each step of the process, and a summary of key takeaways. Photographs and diagrams relevant to the topic are included. The checklists are extendable across all health care professions and are relevant to nursing (RN, NP, LPN, RPN, and CA), allied health, and medical students. They also provide an opportunity for further sharing and collaboration among health care professionals. Students will find this resource valuable at the point of care to reduce the risk of adverse events and to provide a deeper understanding of safety considerations, infection control practice, injury prevention, and the value of consistency in clinical

processes. Key terms are set in bold throughout the book and laid out again in the Glossary in [Appendix 1](#).

Our hope is that not only will the checklists in this resource provide clear and concise guidelines for performing clinical skills in the health care setting, but that they will also improve patient safety and quality of care.

**Note:** For the sake of consistency, we have used the term **patient** to refer to any person who is being cared for in the health care setting.

## SUGGESTED ONLINE RESOURCES

### PATIENT SAFETY

1. [BC Patient Safety and Quality Council](#). This website provides information on the latest initiatives from the BC Ministry of Health to improve clinical issues such as preventing (Deep Venous Thrombosis) DVTs; introducing the 48/6 model of care; improving hand hygiene; creating pathways of care for conditions such as heart failure, stroke, and (transient ischemic attacks) TIAs; reconciling medication; caring for the critically ill; and developing the surgical checklist.
2. [Canadian Patient Safety Institute \(CPSI\)](#). This website provides access to resources, toolkits, events, education, and conferences related to making patient safety happen in health care. It also reviews the latest initiatives.
3. [Institute for Healthcare Improvement Open School](#). Free online courses about health care leadership, patient safety, improving capability, improving patient- and family-centred care, and population health can be found on this resource.
4. [Institute for Safe Medication Practices](#). This is an excellent resource for the latest safety alerts and ways to advance safe administration of medication.

### INTERPROFESSIONAL EDUCATION (IPE)

1. [University of British Columbia Interprofessional Practice Education](#). This resource provides online modules for students to review strategies to work effectively across disciplines.
2. [Institute for Healthcare Improvement \(IHI\)](#). Free resources and strategies on how to improve health and healthcare around the world are listed on this website. It also offers free online courses to enhance teamwork, communication, and other topics related to safety in health care.

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## Disclaimer

The field of health care is constantly changing and evolving. Procedures and policies in schools and health care agencies will change in accordance with research and practice. This resource will require updates to remain in accordance with these changes, but the authors do not assume responsibility for these updates.

Health care professionals must ensure that they have a strong foundation of knowledge in medical conditions and surgical procedures related to clinical skills and techniques before using this resource to guide their practice. Health care professionals should always put agency policy above the information in this resource and be mindful of their own safety and the safety of others. Any health care professional using this resource should do so in the appropriate environment and under the supervision of other relevant health care professionals, in accordance with their governing professional body and within their scope of practice.

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# Chapter 1. Infection Control



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## 1.1 Introduction

In health care, the use of effective and safe infection prevention and control practices is everyone's responsibility. Infection prevention and control guidelines are mandated in hospitals to protect patients, health care personnel, and families from the transmission of organisms that cause infections. This chapter will review the principles of infection prevention and control practices, and the use of additional precautions and personal protective equipment to control and prevent the spread of infection in acute health care settings. The chapter also will explore surgical asepsis, the principles of sterile technique, and procedures related to sterile technique in the operating room and during invasive procedures.

### Learning Objectives

- Define infection prevention and control practices, and list the principles and practices of infection control and prevention
- Explain how to perform hand hygiene using soap and water and alcohol-based hand rubs
- Describe how and when to use additional precautions and personal protective equipment
- Explain the difference between the three types of additional precautions: contact, airborne, and droplet
- Define blood or body fluid exposure and the steps to take if exposed
- Describe when surgical asepsis and sterile technique are used
- Explain the principles of sterile technique
- Describe how to perform various procedures such as surgical hand scrub, applying sterile gloves, and preparing a sterile field



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## 1.2 Infection Prevention and Control Practices

**Infection prevention and control (IPAC) practices** are evidence-based procedures and practices that can prevent and reduce disease transmission, and eliminate sources of potential infections (PIDAC, 2012). When used consistently, IPAC practices will prevent the transfer of **health care associated infections (HAIs)** in all health care settings. HAIs, also known as **nosocomial infections**, are infections that occur in any health care setting as a result of contact with a pathogen that was not present at the time the person infected was admitted (World Health Organization[WHO], 2009a).

Two types of techniques are used to prevent infection in the hospital setting. The first, **medical asepsis**, or **clean technique**, has been used in the past to describe measures for reducing and preventing the spread of organisms (Perry, Potter & Ostendorf, 2014). The second, **sterile technique**, also known as **sterile asepsis**, is a strict technique to eliminate all microorganisms from an area (Perry et al., 2014). When a patient is suspected of having or is confirmed to have certain pathogens or clinical presentations, **additional precautions** are implemented by the health care worker, in addition to routine practices (PIDAC, 2012). These additional precautions are based on how an infection is transmitted, such as by contact, droplet, or air. Additional precautions use personal protective equipment (PPE), such as gowns, eyewear, face shields, and masks, along with environmental controls to prevent transmission of infection.

To reduce, and prevent the spread of, HAIs, **routine practices**, a system of recommended IPAC practices, are to be used consistently with all patients at all times in all health care settings (Public Health Agency of Canada [PHAC], 2012b). The principles of routine practices are based on the premise that all patients are potentially infectious, even when asymptomatic, and IPAC routine practices should be used to prevent exposure to blood, body fluids, secretions, excretions, mucous membranes, non-intact skin, or soiled items (PIDAC, 2012).

To learn the steps for routine practices, see Checklist 1.

**Checklist 1: Routine Practices**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

**Safety considerations:**

- Routine practices must be used by all health care professionals, at all times, with all patients/residents/clients in all health care settings. Routine practices will prevent transmission of microorganisms from patient to patient, patient to staff, staff to patient, and staff to staff.
- The presence of a pathogen does not predict the onset of an infection. The **chain of infection** must be present. If the chain of infection is broken, an infection will not occur. Routine practices are used to break or minimize the chain of infection.
- Be aware of factors that increase a patient’s risk of becoming colonized or infected in the hospital. Increased acuity, advanced age, use of invasive procedures, immunocompromised state of the patient, greater exposure to microorganisms, and an increased use of antimicrobial agents and complex treatments are common risk factors.
- Reduce patient susceptibility to infection by encouraging immunizations, providing adequate rest and nutrition, and protecting the body’s defences from infection (cover open wounds, keep drainage systems closed and intact, maintain skin integrity).
- HAIs can cause symptoms ranging from asymptomatic colonization to septic shock and death, resulting in increased suffering for patients and increased health care costs for Canadians. Ensure additional precautions guidelines are followed for all suspected and confirmed cases of infections and communicable diseases.
- The most common sites for HAIs are the urinary and respiratory systems, and central line-associated bloodstream infections. Consider practices that will reduce infections related to these systems.
- The most common types of HAIs in Canada are methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *Enterococci* (VRE), and *Clostridium difficile* (CDI). Ensure all health care providers and visitors follow the additional precautions policies.

| STEPS  | ADDITIONAL INFORMATION   |
|--|--|
| <p>1. Complete a risk assessment to determine your need for PPE (gown, clean gloves, mask, face shield, or eyewear).</p> | <p>Consider: Will your face, hands, skin, mucous membranes, or clothing be exposed to blood, excretions, or secretions, either by spray, coughing, or sneezing?</p> <p>Will you have contact with the patient’s environment/surfaces?</p> <p>Is an infection or communicable disease suspected or confirmed?</p> |

|   |  |
|---|--|
| <p>2. <a href="#">Perform hand hygiene</a> (hand washing) following hospital policy.</p>  | <p>Hand hygiene is considered the most important and effective measure to prevent HAIs.</p> <p>HAIs are most commonly spread by the hands of health care workers, patients, and visitors.</p> <p>Health care workers, patients, and visitors spread about 80% of all HAIs.</p> <p>Always <a href="#">perform hand hygiene</a> after using the washroom, coughing, or sneezing, and before and after eating.</p> <p>Using an alcohol-based hand rub (ABHR) is the recommended method for hand hygiene if hands are not visibly soiled.</p>  |
| <p>3. Follow proper cleaning or disinfecting procedures of patients and the environment (room etiquette). These environmental controls will control the site or source of microorganism growth.</p> | <p>Dispose of soiled linens and dressings in appropriate receptacle bin.</p> <p>Avoid contact of soiled item with uniform.</p> <p>Clean contaminated objects and sterilize or disinfect equipment and patient rooms according to agency policy.</p> <p>Discard any item that touches the floor.</p> <p>Control sources of wound drainage and body fluids; change soiled dressings.</p> <p>Avoid shaking bed linen or clothes; dust with a damp cloth as required. Microorganisms can be expelled through the air and inhaled by patients and health care workers.</p> <p>Provide all persons with their own linen and personal items.</p> <p>Place syringes in designated puncture-proof containers.</p> <p>Keep table surfaces dry and clean.</p> <p>Empty and dispose of drainage containers as per agency policy.</p> |

|   |   |
|---|---|
| <p>4. Follow respiratory etiquette.</p>   | <p>Wear a mask if coughing or sneezing.</p> <p>Wear a mask if suffering from a respiratory condition, and consider staying home.</p> <p>Avoid talking, sneezing, or coughing over open wounds and sterile dressings.</p> <p>Practise coughing or sneezing into your upper arm, not your hands.</p> <p>Follow hospital policies related to creating healthy workplaces.</p> <p>Do not come to work ill or with symptoms of a communicable disease (flu or cold) that puts co-workers or patients at risk.</p>  |
| <p>5. Wear clean gloves for appropriate activities based on a risk assessment. Use clean gloves when handling all blood and body fluids.</p>  | <p>Follow recommendations for assessing each situation and the need for clean gloves.</p> <p>Improper glove use has been linked to the transmission of microorganisms. Do not wear gloves for activities that do not pose a risk, such as feeding or taking blood pressure.</p> <p>Clean gloves are task specific and for single use only.</p> <p>Handle all blood, body fluids, and laboratory specimens as if infectious.</p> <p>Always <a href="#">perform hand hygiene</a> after taking off clean gloves to reduce the potential of contamination from pathogens on gloves.</p> |
| <p>6. Use <a href="#">additional precautions guidelines</a> for suspected or known infections or communicable diseases. Use PPEs based on mode of infection transmission (contact, droplet, or airborne).</p> | <p>Follow agency guidelines essential to prevent and reduce transmission of infections.</p> <p>Single rooms, <b>cohorting</b> (placing patients with the same infections in the same room if a private room is not available), restricting visitors, and implementing additional environmental controls may be required.</p> <p>Provide instruction/signage for appropriate use and disposal of PPE for visitors, patients, and all health care workers.</p> <p>Remove PPE immediately after single use and <a href="#">perform hand hygiene</a>.</p>                               |
| <p>7. Do not eat or drink in the patient/client or resident areas.</p>  | <p>Eating and drinking increases the risk of transmission of infection between health care providers and patients.</p>  |

|   |  |
|---|--|
| 8. Use avoidance procedures/actions to minimize the risk of infection transmission. | If a patient has uncontrolled diarrhea, wear a gown when changing linen to prevent contamination of clothing and hands.<br><br>If a patient is coughing, sit next to, rather than in front of, the patient when talking to that patient. |
| Data source: CDC, 2007, 2014; Perry et al., 2014; PIDAC, 2012; PHAC, 2012b, 2013    |  |

### Critical Thinking Exercises

1. Name four environmental procedures that can break the chain of infection.
2. What types of patients are at an increased risk for an HAI?
3. How can health care providers reduce patient susceptibility to infection?



---

## 1.3 Hand Hygiene and Non-Sterile Gloves

### Hand Hygiene

Hand hygiene is the most important part of practice for health care workers and is the single most effective way to stop the spread of infections; failure to properly perform hand hygiene is the leading cause of HAIs and the spread of multi-drug-resistant organisms (MDROs) (BC Centre for Disease Control, 2014; WHO, 2009a). **Hand hygiene** is a general term used to describe any action of hand cleaning and refers to the removal or destruction of soil, oil, or organic material, as well as the removal of microbial contamination acquired by contact with patients or the environment. Hand hygiene may be performed using an alcohol-based hand rub (ABHR) or soap and water. A surgical hand scrub is also a method of hand hygiene (WHO, 2009a).

To break the chain of infection, there are five key moments at which to perform hand hygiene when working in health care, as outlined in Checklist 2 and illustrated in Figure 1.1.

**Checklist 2: Five Key Moments in Hand Hygiene**

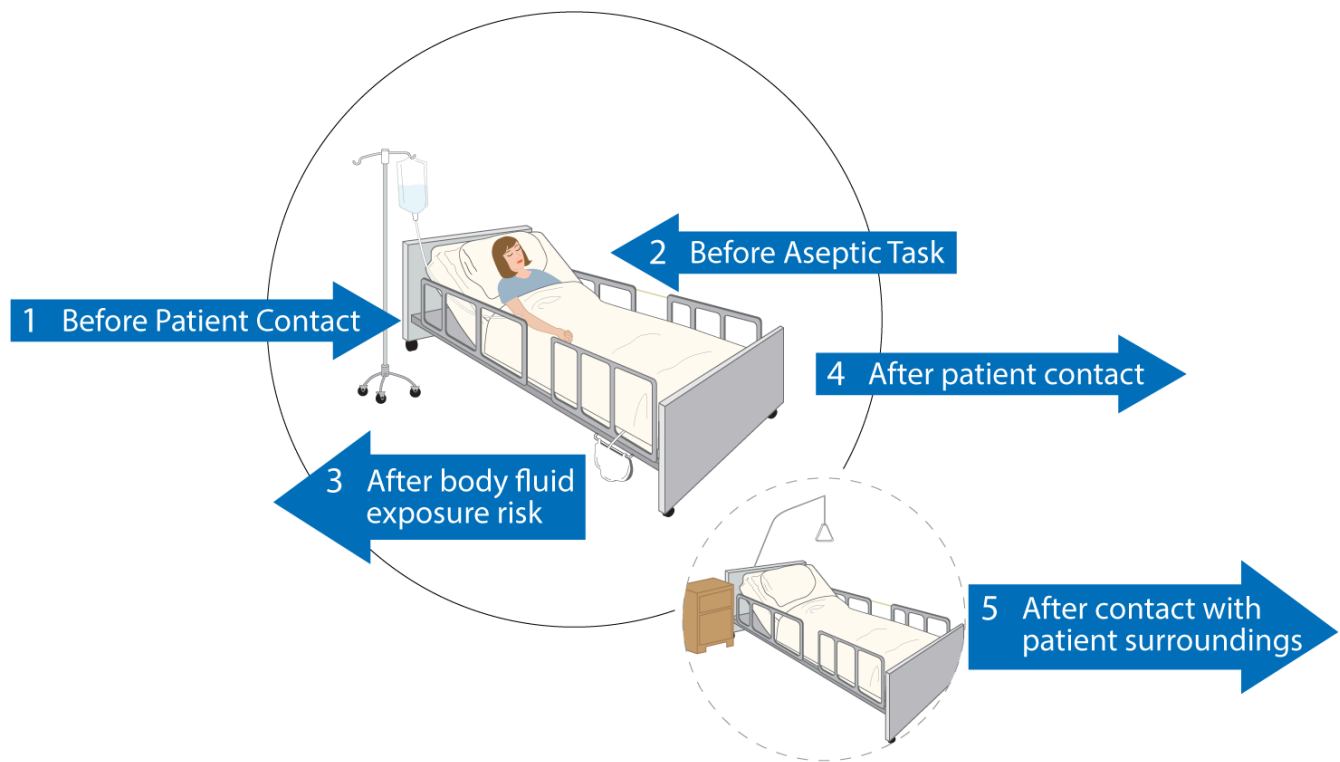
*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- If contact dermatitis occurs, use soap and water for hand hygiene.
- Instruct patients and family on the importance of hand hygiene, proper technique, and ways to incorporate routines into everyday practice.
- Certain practices can increase the risk of skin irritation and should be avoided. For example, washing hands regularly with soap and water immediately before or after using an alcohol-based product is not only unnecessary but may lead to dermatitis.
- Always wash hands whenever in doubt.

| KEY MOMENTS   | ADDITIONAL INFORMATION  |
|---|---|
| 1. Before initial contact with patient/client/resident or environment contact | Before touching a patient (e.g., feeding, toileting, or personal care)<br><br>Before touching the patient's environment<br><br>Before adjusting an IV rate<br><br>Before taking a pulse or blood pressure   |
| 2. Before any clean (routine) or aseptic (sterile) procedure                  | Before applying clean or sterile gloves<br><br>Before performing a sterile dressing change<br><br>Before feeding a patient<br><br>Before performing oral/dental care<br><br>Before inserting eye drops<br><br>Before inserting Foley catheter<br><br>Before preparing medication  |
| 3. After blood or body fluid risk/exposure                                    | After contact with body secretions, mucous membranes, or non-intact skin<br><br>After glove removal (clean or sterile gloves)<br><br>After handling waste (urine, drainage, wound care)<br><br>After wound care or a sterile procedure<br><br>When moving from a contaminated area on the body to a non-contaminated area |
| 4. After contact/touching the patient/client/resident                         | After taking a blood pressure or pulse, touching a urinary catheter, or feeding or dressing a patient   |

|   |   |
|---|---|
| 5. After contact with the patient's/client's/resident's environment | After touching a bed table or bathroom light<br>After touching personal toiletries<br>After touching walkers or wheelchairs<br>After touching electronic IV devices<br>After taking blood pressure or pulse<br>After changing bed linen |
| Data source: Kampf & Loffler, 2003; WHO, 2009a, 2009b               |   |



|   |   |
|---|---|
| 1 Before Patient Contact                  | When? Clean your hands before touching a patient when approaching him or her<br>Why? To protect the patient against harmful germs carried on your hands   |
| 2 Before An Aseptic Task                  | When? Clean your hands immediately before any aseptic task<br>Why? To protect the patient against harmful germs, including the patient's own germs, entering his or her body  |
| 3 After Body Fluid Exposure Risk          | When? Clean your hands immediately after an exposure risk to body fluids (and after glove removal)<br>Why? To protect yourself and the health-care environment from harmful patient germs   |
| 4 After Patient Contact                   | When? Clean your hands after touching a patient and his or her immediate surroundings when leaving<br>Why? To protect yourself and the health-care environment from harmful patient germs   |
| 5 After Contact With Patient Surroundings | When? Clean your hands after touching any object or furniture in the patients immediate surroundings, when leaving - even without touching the patient<br>Why? To protect yourself and the health-care environment from harmful patient germs |

Figure 1.1 Five moments in hand hygiene

### SAFETY ALERT: FACTORS THAT REDUCE HAND HYGIENE EFFECTIVENESS

- **Jewellery:** Rings and bracelets increase microbial count on hands. Rings also increase the risk of torn or pierced gloves. Jewellery should not be worn during patient care (Longtin, Sax, Allegranzi, Schneider, & Pittet, 2011). All jewellery must be removed. In an instance where a bracelet may not be removed due to religious reasons, the bracelet may be pushed as high as possible above the wrist before performing hand hygiene.
- **Skin integrity:** The condition of the hands can influence the effectiveness of hand hygiene,

and proper skin care is essential for infection control (Bissett, 2007). Skin cracks, dermatitis, or cuts can trap bacteria and may place patients at an increased risk (CDC, 2007). Inspect hands for cuts and open sores, and cuticles for tears. Open cuts, sores, or abrasions should be covered prior to starting work. Use barrier creams and lotion after patient care to keep skin healthy and hydrated.

- **Artificial nails and nail extenders:** Artificial nails and nail extenders increase the viral load of bacteria up to nine times compared with bacteria found on hands. Extenders or artificial nails are not recommended for health care workers (Kennedy, 2013).
- **Nail length:** Nails should be a maximum of 1/4-inch long and should not extend past the end of the finger (Patrick & Van Wicklin, 2012). Most microbes on hands come from under the fingernails. Subungual areas (under the fingernails) can harbour higher concentrations of microorganisms (Kennedy, 2013). In addition, long nails are harder to clean and may lead to more frequent puncture in gloves from the thumb and forefinger (Patrick & Van Wicklin, 2012).
- **Nail polish:** Nail polish should be freshly applied and be free from chips or cracks. Studies have shown that chipped nail polish and polish older than four days can harbour microorganisms (Patrick & Van Wicklin, 2012).
- **Water temperature and products:** Warm water removes less protective oils than hot water, whereas hot water increases the likelihood of skin damage (WHO, 2009a). To prevent contamination, products must be dispensed in a disposable pump container that is not topped up. An adequate amount of soap is required to dissolve fatty materials and oils from hands as water alone is not sufficient to clean soiled hands (WHO, 2009a).

## HOW TO WASH HANDS: TYPES OF HAND HYGIENE

Two types of hand hygiene are commonly used in the health care setting: hand hygiene with an alcohol-based hand rub (see Figure 1.2) and **hand hygiene with soap and water**.



*Figure 1.2 Alcohol-based hand rub*

**Alcohol-based hand rub (ABHR)** is a product containing 60% to 90% alcohol concentration and is recommended for hand hygiene in health care settings (CDC, 2012). ABHR is the preferred method of hand hygiene and is more effective than washing hands with soap and water (WHO, 2009a). ABHRs:

- Kill the majority of germs (including viruses) from hands
- Require less time to use than soap and water (20 to 30 seconds)

- Are easy to use and have high levels of availability at the point of care
- Provide better skin tolerability

See Checklist 3 for the steps to take when washing hands with ABHR.




**Checklist 3: Hand Hygiene with ABHR**




*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

**Safety considerations:**

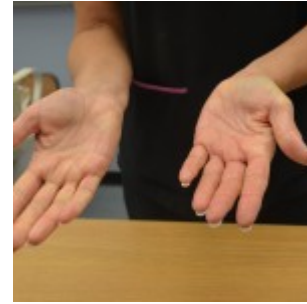
- Do not use in combination with soap and water. This practice may increase skin irritation.
- Use ABHR that contains emollients (oils) to help reduce skin irritation and overdrying.
- Allow hands to dry completely before initiating tasks or applying clean or sterile gloves.
- ABHR may be used for all five moments in hand hygiene (see [Checklist 2](#)) as long as hands are not contaminated or visibly soiled.
- DO NOT use ABHR if patient is suspected to have or confirmed with *Clostridium difficile*, norovirus, or *Bacillus anthracis*. ABHR will not kill spore-forming pathogens.

| STEPS  | ADDITIONAL INFORMATION   |
|--|--|
| <p>1. Remove all jewellery on hands. Apply 1 to 2 pumps of product into palm of dry hands.</p> | <div> </div> <p><i>Remove jewellery</i></p> <p>Product should not be applied to wet hands, as this will dilute the product.</p> <p>Enough product should be applied to thoroughly wet hands and fingers for the entire procedure of 20 to 30 seconds.</p> <div> </div> <p><i>Apply ABHR onto hands</i></p> <p>Always follow the manufacturer's guidelines.</p> |

|   |  |
|---|--|
| <p>2. Rub hands together, palm to palm.</p>                                 | <p>Rubbing hands together ensures palm surfaces are covered by the product.</p>  <p><i>Rub alcohol over entire surface of palms</i></p>    |
| <p>3. Rub the back of the hands.</p>  | <p>Rubbing the back of the hands allows all surfaces of the fingers to be exposed to the product.</p>  <p><i>Rub back of hands</i></p>    |
| <p>4. Rub the alcohol between all the fingers to cover all the fingers.</p> | <p>Rubbing between the fingers allows all surfaces of the hands to be exposed to the product.</p>  <p><i>Rub between the fingers</i></p> |

|   |  |
|---|--|
| <p>5. Press fingertips into the palm of opposing hand and rub back and forth.</p>       | <p>Pressing fingertips into opposing palms and rubbing ensures fingertips and nails are exposed to the cleaning product. Nails harbour more bacteria than do hands.</p>  <p><i>Clean with ABHR under the fingernails</i></p> |
| <p>6. Rub each thumb in a circle in the palm of the opposite hand.</p>                  | <p>Rubbing each thumb provides complete coverage of the product on the thumb.</p>  <p><i>Clean the surface of thumb</i></p>   |
| <p>7. Rub hands together until they are dry. Do not use a paper towel to dry hands.</p> | <p>Rubbing hands together provides adequate time for the alcohol to dry. The minimum time required for proper rubbing technique when using ABHR is 20 to 30 seconds.</p>  <p><i>Rub hands until dry</i></p>                |

8. Hands are now safe to use.



*Clean hands*

Data source: CDC, 2012; PIDAC, 2012; PHAC, 2012b; WHO, 2009a, 2009b

## **HAND HYGIENE WITH SOAP AND WATER**

Hand hygiene with water requires soap to dissolve fatty materials and facilitate their subsequent flushing with water. Soap must be rubbed on all surfaces of both hands followed by thorough rinsing and drying. Water alone is not suitable for cleaning soiled hands (WHO, 2009a). The entire procedure should last 40 to 60 seconds and should use soap approved by the health agency. See the steps in Checklist 4.




**Checklist 4: Hand Hygiene with Soap and Water**




*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- Always wash hands with soap and water if hands are visibly dirty or soiled.
- When working with patients where *Clostridium difficile* (CDI), norovirus, or *Bacillus anthracis* is suspected or confirmed, soap and water must be used. CDI can remain dormant on surfaces for long periods of time.
- Always use soap and water if hands are exposed to blood or body fluids.
- Multi-step rubbing techniques using soap and water are required to promote coverage of all surfaces on hands. Friction and rubbing are required to remove oil and debris from hands.

| STEPS  | ADDITIONAL INFORMATION   |
|--|--|
| <p>1. Remove all jewellery. Wet hands with warm water.</p> | <div> </div> <p><i>Remove jewellery</i></p> <p>A comfortable temperature of water should be used. Hot water may damage skin.</p> <div> </div> <p><i>Regulate water temperature</i></p> |

|  |   |
|--|---|
| <p>2. Apply 1 to 2 pumps of soap.</p>                | <p>Enough soap should be used to lather the palms, back of hands, fingers, and thumbs.</p>  <p><i>Dispense soap</i></p>                                       |
| <p>3. Lather soap and rub palms together.</p>        | <p>Ensure all surfaces of the palms are covered with soap, using friction to remove debris and oil.</p>  <p><i>Lather hands with soap and water</i></p>       |
| <p>4. Rub in between fingers and around fingers.</p> | <p>Ensure all surfaces of the fingers are covered with soap, using friction to remove debris and oil.</p>  <p><i>Rub hands to remove debris and oil</i></p> |

|  |  |
|--|--|
| <p>5. Rub the back of each hand with the palm of the opposite hand.</p>                | <p>Ensure all surfaces on the back of the hands are covered with soap, using friction to remove debris and oil.</p>  <p><i>Rub the back of the hands</i></p>                       |
| <p>6. Press and rub fingernails and fingertips into the palm of the opposite hand.</p> | <p>Ensure all surfaces around the fingertips are covered with soap, using friction to remove debris and oil.</p>  <p><i>Clean tips of fingers and underneath nailbeds</i></p>      |
| <p>7. Rub each thumb in a circle with the palm of the opposite hand.</p>               | <p>Ensure all surfaces around the thumbs are covered with soap, using friction to remove debris and oil.</p>  <p><i>Clean around the thumb up to the wrist on both hands</i></p> |

8. Rinse hands under water by keeping fingers pointing downward toward the drain.

Rinsing in this way allows the oil and debris to be washed off the hands and down the drain.



*Rinse soap and water off hands*

9. Pat hands dry using clean paper towel.

Use a gentle action to prevent skin irritation.



*Dry hands*

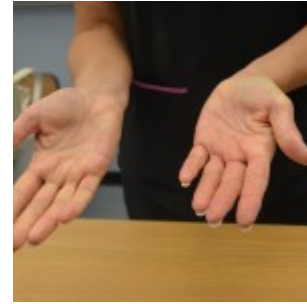
10. Using a clean paper towel, turn off faucet.

Using a paper towel prevents re-contamination of hands by touching dirty faucet handles.



*Turn off faucet with dry paper towel*

11. Hands are now safe to use.



Clean hands

Data source: Accreditation Canada, 2013; CDC, 2014; PHAC, 2012a; WHO, 2009a

## Non-sterile (Clean) Gloves

Both hand hygiene and clean glove use are strategies to prevent transmission of infections through hand contact. In the context of patient care, it makes sense to think of glove use and hand hygiene as complementary strategies to prevent transmission of pathogens. Gloves are critical to prevent the transmission of organisms when hand hygiene alone is not enough in an outbreak such as *Clostridium difficile* or the norovirus, or when a patient has a suspected or known pathogen. Studies have shown that gloves reduce transmission of microbes from the hands of health care workers (PIDAC, 2012).

Non-sterile gloves are single use and should be applied:

- Before an aseptic procedure
- When anticipating contact with blood or body fluid, non-intact skin, secretions, excretions, mucous membranes, or equipment/environmental surfaces contaminated with the above blood or body fluids
- When in contact with a patient or patient equipment/environment during additional precautions

Non-sterile gloves should be removed:

- If gloves are damaged and integrity is compromised
- When contact with blood, body fluid, non-intact skin, or mucous membranes has ended
- When contact with a single patient and that patient's surrounding or a contaminated body site on a patient has ended
- When there is an indication for hand hygiene

See Checklist 5 for steps on how to apply non-sterile gloves.

**Checklist 5: Applying Non-Sterile Gloves**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- Hands must be clean and dry before putting on gloves. Gloves do not replace the need for hand hygiene.
- Hand hygiene must be performed every time gloves are removed. Gloves are not completely free of leaks or 100% tear-proof, and hands may become contaminated when gloves are removed.
- Gloves are for single patient use and must be removed after caring for one patient. Reuse of gloves has been associated with transmission of antibiotic-resistant organisms.
- Change or remove gloves if moving from a contaminated site to a non-contaminated site on the same person or if touching the environment.
- Wear gloves that fit properly. Different sizes are available.
- Gloves must be removed immediately and discarded in a waste bin after the activity for which they were used and before exiting a patient’s environment.
- Gloves are not required for health care activities where contact is limited to intact skin, such as taking blood pressure.
- Indiscriminate or improper glove use (e.g., wearing gloves all the time) has been linked to transmission of pathogens.
- Gloves should fit snugly around wrists and hands for use with a gown to provide a better skin barrier.

**STEPS**

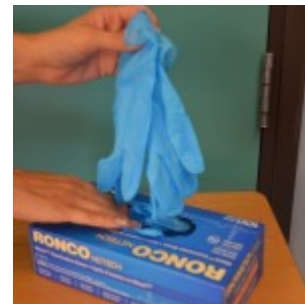
**ADDITIONAL INFORMATION**

1. Perform hand hygiene.







*Hand hygiene with ABHR*

2. Select the appropriate size of non-sterile gloves. Remove gloves one at a time out of the box, touching only the top of the cuff.



*Remove gloves from box*

|   |   |
|---|---|
| <p>3. Put hand through opening and pull up to the wrist.</p>  |  <p><i>Apply first glove</i></p>                                    |
| <p>4. Repeat procedure with the second hand.</p>  |  <p><i>Apply second glove</i></p>                                   |
| <p>5. Adjust gloves to cover wrists or gown as required.</p>  | <p>Prevents the contamination of the wrists.</p>  |
| <p>6. Complete care as required.</p>  |  <p><i>Non-sterile gloved hands</i></p>                           |
| <p><b>HOW TO REMOVE GLOVES</b></p>  |   |
| <p>1. Grasp glove on the outside about 1/2 inch below the cuff (edge of the glove opening). Do not touch the wrist with the other hand.</p> |  <p><i>Grasp glove on the outside 1/2 inch below the cuff</i></p> |

2. Pull down glove, turning it inside out. Hold the inside-out glove in the gloved hand.



*Pull glove off ...*



*... inside out*

3. Gather the inside-out glove in the gloved hand.






*Gather inside-out glove in remaining gloved hand*

4. Insert finger of the bare hand under the cuff of the gloved hand.



*Insert finger under cuff of gloved hand*

|   |   |
|---|---|
| <p>5. Pull down the glove until it is inside out, drawing it over the first glove.</p>  |  <p><i>Remove second glove</i></p>  |
| <p>6. Discard gloves in a garbage container.</p>  | <p>This step reduces the spread of microorganisms.</p>  <p><i>Discard used non-sterile gloves</i></p> |
| <p>7. Perform hand hygiene.</p>   | <p>This step reduces the spread of microorganisms.</p>  <p><i>Hand hygiene with ABHR</i></p>        |
| <p>Data source: Braswell &amp; Spruce, 2012; PIDAC, 2012; Poutanen, Vearncombe, McGeer, Gardam, Large, &amp; Simor, 2005; PHAC, 2012a; WHO, 2009a</p> |   |

## LATEX ALLERGIES AND NON-STERILE (CLEAN) GLOVE USE

A **latex allergy** is a reaction to the proteins in natural rubber latex (American Academy of Allergy, Asthma and Immunology, 2014). When people come in contact with latex, an allergic reaction may occur. Most reactions are mild (asthma-like symptoms or contact dermatitis), but there are some rare severe cases (reactions). Many hospitals have moved away from using latex gloves, but latex is commonly used in many health care products such as IV tubing, urinary catheters, syringes, dressings, and bandages. People at risk for developing a latex allergy are:

- Health care workers and others who frequently wear latex gloves
- People who have had many surgeries (10+)
- People who are often exposed to natural rubber latex
- People with other allergies, such as hay fever (allergic rhinitis), or allergies to certain foods

Note that powdered latex gloves have also been associated with latex allergies. If an allergy to latex exists, the best treatment is to avoid latex and use a medical alert bracelet to inform others of the allergy (PIDAC, 2012).

#### Critical Thinking Exercises

1. Name four factors that decrease the effectiveness of hand hygiene.
2. What are two ways to reduce or prevent skin irritation with hand hygiene or non-sterile (clean) glove use?

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## 1.4 Additional Precautions and Personal Protective Equipment (PPE)

Certain pathogens and communicable diseases are easily transmitted and require additional precautions to interrupt the spread of suspected or identified agents to health care providers, other patients, and visitors (PIDAC, 2012). Additional precautions are used in addition to routine precautions and are defined by how a microorganism is transmitted (Perry et al., 2014).

### TYPES OF ADDITIONAL PRECAUTIONS

There are three categories of additional precautions: contact precautions, droplet precautions, and airborne precautions.

**Contact precautions** are the most common type of additional precautions. They are used in addition to routine practice for patients who are known or suspected to be infected with microorganisms that can be transferred by direct (touching) or indirect (shared equipment) contact. Types of organisms in this category are **antibiotic-resistant organisms (AROs)** such as **methicillin-resistant *Staphylococcus aureus* (MRSA)**, **vancomycin-resistant *Enterococci* (VRE)**, extended spectrum beta-lactamase (ESBL), ***Clostridium difficile* (CDI)**, carbapenemase-producing organisms (CPO), diarrhea, and scabies. AROs are also known as multi-drug-resistant organisms (MDROs).

**Droplet precautions** are used in addition to routine practices for patients who are known or suspected to be infected with microorganisms that are spread through the air by large droplets. Types of organisms and unconfirmed conditions in this category include mumps, influenza, vomiting of unknown cause, norovirus, and unconfirmed cough.

**Airborne precautions** are used in addition to routine practices for patients who are known to have or are suspected of having an illness that is transmitted by small droplet nuclei that may stay suspended in the air and be inhaled by others. These particles can remain infectious for a long period of time when spread through the air. Types of organisms in this category include tuberculosis (TB), measles, chicken pox (varicella), disseminated zoster, and severe acute respiratory syndrome (SARS).

### SPECIAL CONSIDERATIONS:

- **Signage and accommodation:** Signs must state the type of precaution required for the patient and be displayed on the door or at the foot of the bed. Accommodation in a private room, or cohorting patients with the same type of infection, is acceptable. Private bathrooms are preferred.
- **Personal protective equipment (PPE):** PPE is clothing or equipment worn to protect staff from catching or transmitting an infection. Depending on the type of additional precaution, PPEs are required when performing patient care tasks and may consist of a mask, gown, gloves, face shield, and/or eyewear.
- **Consistent communication:** Patients on additional precautions must be clearly identified on

their patient chart or requisitions to ensure all hospital personnel, departments, or other health care settings know what additional precautions to use.

- Visitor information: Visitors must be informed of the precautions and must wear the appropriate PPEs and follow the routine practices for health care settings. Visitors also must wear the same PPEs as the health care provider if providing direct care for the patient.
- Multiple additional precautions: Some microorganisms may be transmitted by more than one mode and, therefore, more than one additional precaution is needed. For example, a patient with suspected or confirmed Ebola virus disease (EVD) would be on contact and droplet precautions.
- Aerosol procedures: Aerosol-generating medical procedures (such as tracheostomy care, CPR, nebulized therapy) may increase risk of transmitting infectious agents. Airborne precautions may be initiated during specific procedures when a patient is suspected of having or confirmed to have TB.

Tables 1.1, 1.2, and 1.3. summarize the three categories of additional precautions.

**Table 1.1 Contact Precaution Guidelines**

| <b>PPE</b>   | <b>Private Room</b>  | <b>Visitors</b>   | <b>Patient Transport</b>                             | <b>Cleaning</b>                                 |
|--|--|---|--|---|
| Gown, gloves   | Private room preferred or cohort patients.<br><br>Must have own dedicated equipment. | Gown and gloves must be worn if providing direct care.<br><br>Must <a href="#">perform hand hygiene</a> before and after care.<br><br>Must not go into other patient rooms. | Patient: none required<br><br>Staff: gown and gloves | Additional daily room cleaning may be required. |
| Data source: PIDAC, 2012; PHAC, 2013; Siegal, Rhinehart, Jackson, & HICPAC, 2007 |  |   |  |   |

**Table 1.2 Droplet Precautions**

| <b>PPE</b>  | <b>Private Room</b>   | <b>Visitors</b>   | <b>Patient Transport</b>     | <b>Cleaning</b>                                 |
|---|---|---|------------------------------|---|
| Gloves, gown, and a surgical mask if within two metres of the patient | Private room preferred or cohort.<br><br>Must have own dedicated equipment. | Gown, gloves, surgical masks, and eye protection are worn for all activities within two metres of the patient.<br><br>The patient must wear a surgical mask when leaving the room.<br><br>The door may remain open.<br><br>Strict adherence to hand hygiene must be observed.<br><br>Gloves, gown, and surgical mask must be worn if providing direct care. Must perform hand hygiene before and after care.<br><br>Visitors may not go into other patient rooms. | Patient: gown, surgical mask | Additional daily room cleaning may be required. |
| Data source: PIDAC, 2012; PHAC, 2013; Siegal et al., 2007             |   |   |                              |   |

**Table 1.3 Airborne Precautions**

| <b>PPE</b>   | <b>Private Room</b>   | <b>Visitors</b>  | <b>Patient Transport</b>                                | <b>Cleaning</b>                                 |
|--|---|--|---|---|
| Must wear N95 respirator prior to entering room.<br><br>Strict adherence to hand hygiene.<br><br>Must remove N95 respirator after exiting the room.<br><br>No immune-compromised persons to enter room. Care providers should have current vaccines. | Yes.<br><br>Must have a negative pressure room.<br><br>Must have own dedicated equipment.<br><br>Keep the door closed whether or not the patient is in the room.<br><br>The room should have bathroom facilities.<br><br>The room must be a single room, preferably one that is under negative pressure. When a negative pressure room is unavailable, refer to your health authority policy to determine whether a transfer to another facility is mandated. | Gloves, gown, and surgical mask required if providing direct care. Must <a href="#">perform hand hygiene</a> before and after care.<br><br>Must not go into other patient rooms. | Patient: must wear surgical mask<br><br>Staff: N95 mask | Additional daily room cleaning may be required. |
| Data source: PIDAC, 2012; PHAC, 2013; Siegal et al., 2007  |   |  |   |   |

## **PERSONAL PROTECTIVE EQUIPMENT (PPE)**



Additional precautions require the use of **personal protective equipment (PPE)**, which is equipment or clothing worn by staff to prevent the transmission of infection from patient to staff or to family member (PIDAC, 2012). All PPE must be applied and removed in a specific order to ensure the skin, nose, mouth, and eyes are covered to prevent transmission of infection to health care providers. Depending on the type of additional precaution or risk assessment, a gown, goggles, face shield, and mask (surgical or N95) may be used during patient care. Refer to Checklist 6 for steps to take when donning (putting on) PPE.

**Checklist 6: Donning PPE**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- The selection of PPE is based on the nature of the interaction with the patient and the likelihood of transmission of infectious agents.
- PPE should be put on just prior to the interaction with the patient and should be removed immediately after the interaction, followed by hand hygiene.
- Patients may feel depressed or lonely when isolated in a room or experiencing decreased contact with health care providers. Support for individuals on isolation must be provided. Conversely, some patients may appreciate the privacy of an individual room.

| STEPS   | ADDITIONAL INFORMATION   |
|---|--|
| <p>1. Remove rings, bracelets, and watches. <a href="#">Perform hand hygiene.</a></p> | <p>This prepares hands for direct patient care.</p>  <p><i>Perform hand hygiene</i></p>   |
| <p>2. Apply waterproof long-sleeved gown. Tie the neck and waist strings.</p>         | <p>Waterproof gown prevents any potential cross-contamination from blood or body fluids onto forearms and body.</p>  <p><i>Apply waterproof gown</i></p> |

3. Apply surgical or N95 mask. Ensure the fit is secure with no air leaks. Secure the metal band around the nose and pull mask over chin as required.

Wearing a poor-fitting mask is the number one reason for exposure to pathogens for health care providers.

Masks should be worn if provider is within two metres of a coughing or sneezing patient or if there is a potential for spray of secretions or excretions.



*Surgical mask (left) and N95 mask (right)*

Replace mask if it becomes wet or soiled.



*Apply mask*

4. Apply goggles or face shield.

Goggles or a face shield prevents accidental exposure to eyes, nose, and mouth. Goggles can be placed on top of eyeglasses.

Prescription glasses are not an alternative to goggles as they do not protect the entire eye.



*Apply goggles*

5. Apply non-sterile gloves over top of the gown.

Non-sterile gloves ensure complete coverage of skin on arms for direct patient care.





*Apply non-sterile gloves over top of sleeves*




Data source: Barratt, Shaban, & Moyle, 2011; PIDAC, 2012; PHAC, 2012b



See Checklist 7 for steps on how to doff or remove PPE.

**Checklist 7: Doffing PPE**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

| STEPS   | ADDITIONAL INFORMATION   |
|---|--|
| <p>1. Remove gloves.</p>                        | <p>Grasp outer edge of glove by wrist and peel away from hand, rolling the glove inside out. Roll it into a ball in gloved hand.</p> <p>With the bare hand, reach under the second glove and gently peel down off the fingers.</p>  <p><i>Place bare finger under glove to avoid contamination from glove</i></p> <p>Drop glove into garbage bin.</p> <p>Always <a href="#">perform hand hygiene</a> after removing gloves. Gloves are not tear- or leak-proof. Hands may have been contaminated upon removal of the gloves.</p> |
| <p>2. <a href="#">Perform hand hygiene.</a></p> | <p>Clean hands if they feel or look dirty.</p>  <p><i>Perform hand hygiene</i></p>   |

|   |   |
|---|---|
| <p>3. Remove gown.</p>                          | <p>Remove gown in a manner that does not contaminate clothing. Starting at the neck ties, pull the outer (contaminated) part forward and, turned inward, roll into a ball. Discard in appropriate receptacle bin.</p>  <p><i>Remove gown</i></p>              |
| <p>4. <a href="#">Perform hand hygiene.</a></p> | <p>Always <a href="#">perform hand hygiene</a> after removing gown. Hands may have been contaminated upon removal of the gown.</p>  <p><i>Perform hand hygiene</i></p>   |
| <p>5. Remove eye protection or face shield.</p> | <p>Arms of goggles and the headband on the face shield are considered clean. Handle these only by the sides. The front of the face shield or goggles is considered contaminated. Dispose them according to agency policy.</p>  <p><i>Remove goggles</i></p> |

|  |   |
|--|---|
| <p>6. Remove mask/N95 respirator.</p>  | <p>Ties, earlobe loops, or straps are considered clean and may be touched. If tied, remove bottom tie first, then top tie. Remove ear loops or straps by leaning forward to allow the mask to slip off your face.</p> <p>Dispose of the mask in the garbage bin.</p>  <p><i>Remove mask</i></p> |
| <p>7. <a href="#">Perform hand hygiene.</a></p>  | <p>This step reduces the transmission of microorganisms.</p>  <p><i>Perform hand hygiene</i></p>   |
| <p>Data source: Barratt et al., 2011; Perry et al., 2014; PHAC, 2012b; Siegal et al., 2007</p> |   |

VIDEO 1.1

Watch the video [Donning and Doffing PPE](#) by [Renée Anderson & Wendy McKenzie](#), Thompson Rivers University.

[Go through the Protecting Patti interactive activity](#) to review donning and doffing.

## **BLOOD OR BODY FLUID (BBF) EXPOSURE**

A **blood and body fluid (BBF) exposure** is defined as an exposure to potentially infectious body fluids or blood through the following methods: a puncture wound by a sharp object or needle (percutaneous exposure), from a body fluid/blood splash onto your mucous membranes (permucosal exposure) or exposure through eczema, an open wound/skin or scratch (non-intact skin exposure) (BCCDC, 2015).

Post-exposure management is only required when (1) percutaneous, permucosal, or non-intact skin is exposed to a BBF; (2) the exposure is to blood or potentially infectious body tissue or fluid; (3) the source is considered potentially infectious (e.g., patient is part of a high-risk group, exposure occurred in a high-risk setting, or patient has a positive test); and (4) the exposed person is considered susceptible to HIV, hepatitis B, or hepatitis C. Checklist 8 explains what to do if exposed.

**Checklist 8: BBF Exposure**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- Evidence shows that antiretroviral therapy can reduce the transmission of HIV by 86%.
- The risks and benefits of the post-exposure immunoprophylaxis should be discussed and appropriate recommendations made by the physician to the exposed person.
- Despite the relatively low risk of infection from an exposure, the event is associated with stress and anxiety for the exposed person.
- Seek advice from a physician at a hospital, walk-in clinic, or community clinic within two hours of any BBF exposure.
- Not all body fluids are implicated in transmission of viruses. Review the [CDC guidelines](#) to understand which body fluids are implicated in transmitting HIV and hepatitis B and C.

| STEPS   | ADDITIONAL INFORMATION   |
|---|--|
| <p>1. Wash the exposed skin, mucous membrane, or eye.</p>   | <p>Skin: Wash the area thoroughly with soap and water.</p> <p>Mucous membranes or eye: Rinse area with water or normal saline.</p> <p>Allow injury/wound site to bleed freely and then cover lightly.</p> <p>Do not promote bleeding of percutaneous injuries by cutting, scratching, or squeezing or puncturing the skin. This may damage the skin and increase uptake of any pathogens.</p> <p>Do not apply bleach or soak wound/injury in bleach.</p> |
| <p>2. Contact first aid for assistance and obtain proper forms. These forms are also available in emergency departments.</p>  | <p>If unable to contact first aid, proceed to the emergency room.</p>  |
| <p>3. Advise your supervisor or charge nurse of the incident. Ask them to complete the required form and return it to you.</p>  | <p>This step allows for follow-up by the manager, in relation to a BBF exposure.</p>   |
| <p>4. A risk assessment should be completed within two hours. Go to the emergency room or urgent care centre and be assessed by a physician/NP.</p> <p>Inform the department personnel that an occupational BBF exposure has occurred. You will be assessed and blood work will be drawn.</p> | <p>Emergency rooms or other health agencies are supplied with antiretroviral kits from the BC Centre for Excellence in HIV/AIDS.</p> <p>Physicians will assess your risk of exposure and the risk of transmission from source.</p>   |

|   |   |
|---|---|
| 5. Following treatment, return to your department and report the incident according to agency policy. | This ensures that the proper procedure is followed and the incident form is filled out to prevent or minimize further exposure. |
| Data source: BCCDC, 2015  |   |

### Critical Thinking Exercises

1. A family member has come into the health care setting to visit his mother, who has been admitted with chicken pox. List four infection preventive measures to discuss with the family member.
2. How is PPE selected for patient care?



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## 1.5 Surgical Asepsis and the Principles of Sterile Technique

### SURGICAL ASEPSIS

**Asepsis** refers to the absence of infectious material or infection. **Surgical asepsis** is the absence of all microorganisms within any type of invasive procedure. **Sterile technique** is a set of specific practices and procedures performed to make equipment and areas free from all microorganisms and to maintain that sterility (BC Centre for Disease Control, 2010). In the literature, surgical asepsis and sterile technique are commonly used interchangeably, but they mean different things (Kennedy, 2013). Principles of sterile technique help control and prevent infection, prevent the transmission of all microorganisms in a given area, and include all techniques that are practised to maintain sterility.

Sterile technique is most commonly practised in operating rooms, labour and delivery rooms, and special procedures or diagnostic areas. It is also used when performing a sterile procedure at the bedside, such as inserting devices into sterile areas of the body or cavities (e.g., insertion of chest tube, central venous line, or indwelling urinary catheter). In health care, sterile technique is always used when the integrity of the skin is accessed, impaired, or broken (e.g., burns or surgical incisions). Sterile technique may include the use of sterile equipment, sterile gowns, and gloves (Perry et al., 2014).

Sterile technique is essential to help prevent **surgical site infections (SSI)**, an unintended and oftentimes preventable complication arising from surgery. SSI is defined as an “infection that occurs after surgery in the area of surgery” (CDC, 2010, p. 2). Preventing and reducing SSI are the most important reasons for using sterile technique during invasive procedures and surgeries.

### PRINCIPLES OF SURGICAL ASEPSIS

All personnel involved in an aseptic procedure are required to follow the principles and practice set forth by the Association of periOperative Registered Nurses (AORN). These principles must be strictly applied when performing any aseptic procedures, when assisting with aseptic procedures, and when intervening when the principles of surgical asepsis are breached. It is the responsibility of all health care workers to speak up and protect all patients from infection. See Checklist 9 for the principles of sterile technique.

**Checklist 9: Principles of Sterile Technique**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- Hand hygiene is a priority before any aseptic procedure.
- When performing a procedure, ensure the patient understands how to prevent contamination of equipment and knows to refrain from sudden movements or touching, laughing, sneezing, or talking over the sterile field.
- Choose appropriate PPE to decrease the transmission of microorganisms from patients to health care worker.
- Review hospital procedures and requirements for sterile technique prior to initiating any invasive procedure.
- Health care providers who are ill should avoid invasive procedures or, if they can't avoid them, should double mask.

| STEPS   | ADDITIONAL INFORMATION  |
|---|---|
| 1. All objects used in a sterile field must be sterile.   | <p>Commercially packaged sterile supplies are marked as sterile; other packaging will be identified as sterile according to agency policy.</p> <p>Check packages for sterility by assessing intactness, dryness, and expiry date prior to use.</p> <p>Any torn, previously opened, or wet packaging, or packaging that has been dropped on the floor, is considered non-sterile and may not be used in the sterile field.</p> |
| 2. A sterile object becomes non-sterile when touched by a non-sterile object.                                       | <p>Sterile objects must only be touched by sterile equipment or sterile gloves.</p> <p>Whenever the sterility of an object is questionable, consider it non-sterile.</p> <p>Fluid flows in the direction of gravity. Keep the tips of forceps down during a sterile procedure to prevent fluid travelling over entire forceps and potentially contaminating the sterile field.</p>  |
| 3. Sterile items that are below the waist level, or items held below waist level, are considered to be non-sterile. | <p>Keep all sterile equipment and sterile gloves above waist level.</p> <p>Table drapes are only sterile at waist level.</p>  |
| 4. Sterile fields must always be kept in sight to be considered sterile.  | <p>Sterile fields must always be kept in sight throughout entire sterile procedure.</p> <p>Never turn your back on the sterile field as sterility cannot be guaranteed.</p>   |

|   |   |
|---|---|
| <p>5. When opening sterile equipment and adding supplies to a sterile field, take care to avoid contamination.</p>                        | <p>Set up sterile trays as close to the time of use as possible.</p> <p>Stay organized and complete procedures as soon as possible.</p> <p>Place large items on the sterile field using sterile gloves or sterile transfer forceps.</p> <p>Sterile objects can become non-sterile by prolonged exposure to airborne microorganisms.</p>   |
| <p>6. Any puncture, moisture, or tear that passes through a sterile barrier must be considered contaminated.</p>                          | <p>Keep sterile surface dry and replace if wet or torn.</p>   |
| <p>7. Once a sterile field is set up, the border of one inch at the edge of the sterile drape is considered non-sterile.</p>              | <p>Place all objects inside the sterile field and away from the one-inch border.</p>  |
| <p>8. If there is any doubt about the sterility of an object, it is considered non-sterile.</p>   | <p>Known sterility must be maintained throughout any procedure.</p>   |
| <p>9. Sterile persons or sterile objects may only contact sterile areas; non-sterile persons or items contact only non-sterile areas.</p> | <p>The front of the sterile gown is sterile between the shoulders and the waist, and from the sleeves to two inches below the elbow.</p> <p>Non-sterile items should not cross over the sterile field. For example, a non-sterile person should not reach over a sterile field.</p> <p>When opening sterile equipment, follow best practice for <a href="#">adding supplies to a sterile field</a> to avoid contamination.</p> <p>Do not place non-sterile items in the sterile field.</p>  |
| <p>10. Movement around and in the sterile field must not compromise or contaminate the sterile field.</p>                                 | <p>Do not sneeze, cough, laugh, or talk over the sterile field.</p> <p>Maintain a safe space or margin of safety between sterile and non-sterile objects and areas.</p> <p>Refrain from reaching over the sterile field.</p> <p>Keep operating room (OR) traffic to a minimum, and keep doors closed.</p> <p>Keep hair tied back.</p> <p>When pouring sterile solutions, only the lip and inner cap of the pouring container is considered sterile. The pouring container must not touch any part of the sterile field. Avoid splashes.</p> |
| <p>Data source: Kennedy, 2013; Infection Control Today, 2000; ORNAC, 2011; Perry et al., 2014; Rothrock, 2014</p>                         |   |

VIDEO 1.2

Watch the video [Principles of Asepsis](#) by [Renée Anderson & Wendy McKenzie](#), Thompson Rivers University.

Critical Thinking Exercises

1. When should a sterile field be opened (under normal circumstances)?
2. What part of the sterile field is considered non-sterile?

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## 1.6 The Operating Room Environment

The operating room (OR) is a sterile, organized environment. As a health care provider, you may be required to enter the OR during a surgical procedure or to set up before a surgical procedure. It is important to understand how to enter an OR area and how the OR area functions to maintain an sterile environment.

Members of the surgical team work hard to coordinate their efforts to ensure the safety and care of their patients. The surgical team is in charge of the OR and makes decisions regarding patient care procedures. The OR environment has sterile and non-sterile areas, as well as sterile and non-sterile personnel. It is important to know who is sterile and who not, and which areas in the OR are sterile or non-sterile.

### STERILE OR PERSONNEL

- Surgeon
- Surgical assistant
- Scrub nurse

### NON-STERILE OR PERSONNEL

- Anesthesiologist
- Circulating nurse
- Technologist, student, or observer

There are specific requirements for all health care professionals entering the OR to minimize the spread of microorganisms and maintain sterility of the OR environment. Prior to entering the OR, show your hospital-issued ID and inform the person in charge of the purpose of your visit. Refer to Checklist 10 for the specific steps to take before entering an OR.

**Checklist 10: Entering the OR**

| <i>Disclaimer: Always review and follow your hospital policy regarding this specific skill.</i>                        |   |
|--|---|
| STEPS  | ADDITIONAL INFORMATION  |
| 1. Bring all required supplies to the OR. Sterilize or disinfect them as required.                                     | This step prevents the need to unnecessarily leave the restricted area.<br><br>Movement in the OR should be kept to a minimum to avoid contamination of sterile items or persons. |
| 2. State the purpose of your visit to OR personnel and show your ID.   | This step allows for clear communication with the health care team.   |
| 3. Artificial nails should not be worn, and nail polish should be fresh (not more than four days old) and not chipped. | Artificial nails, extenders, and chipped nail polish harbour more microorganisms than hands and can potentially contaminate the sterile area.                                     |
| 4. Remove all jewellery. Wedding bands may be permitted under agency policy.   | Jewellery harbours additional microorganisms and must be removed prior to a surgical hand scrub.  |
| 5. Don surgical attire (top and bottom). Surgical attire must be worn only in the surgical area. Tuck top into pants.  | Surgical attire must be worn only in the surgical area to avoid contamination outside the surgical area.  |
| 6. Cover shoes according to agency policy.   | Shoe covers will protect work shoes from accidental blood or body fluid spills in the OR. Shoe covers must not be worn outside the OR area.                                       |
| 7. Perform a surgical hand scrub according to agency policy.   | Surgical hand scrubs reduce the bacterial count on hands prior to applying sterile gloves. Hands are kept above waist at all times.   |

|  |  |
|--|--|
| <p>8. Prior to entering the restricted or semi-restricted area:</p> <ol style="list-style-type: none"> <li>1. Apply mask.</li> <li>2. Apply head covering to cover earrings, beard, and sideburns.</li> <li>3. Once in the OR, introduce yourself to the surgical staff and inquire about the sterile area and non-sterile areas.</li> </ol> | <p>Mask must cover nose, mouth, and chin for a proper seal. Mask should be changed if it becomes wet or soiled.</p> <p>A surgical mask or N95 mask may be required, depending on whether the patient is on <a href="#">additional precautions</a>.</p> <p>Knowing what area is sterile/non-sterile will prevent accidental contamination of sterile fields and delays in surgery.</p> <p>STERILE PERSONS/AREA</p> <p>The sterile field should be created as close as possible to the time of use. Covering sterile fields is not recommended.</p> <p>Sterile areas should be continuously kept in view. An unguarded sterile field is considered contaminated.</p> <p>Sterile persons should keep well within the sterile area. Sterile persons should pass each other back to back or front to front. A sterile person should face a sterile area to pass it and stay within the sterile field.</p> <p>NON-STERILE PERSON/AREA</p> <p>A non-sterile person should stay at least one foot away from the sterile field, and face the sterile field when passing it.</p> <p>A non-sterile person should not walk between two sterile fields or reach over the sterile field.</p> |
| <p>Data source: Kennedy, 2013; ORNAC, 2011; Perry et al., 2014; Rothrock, 2014</p>   |  |

### Critical Thinking Exercises

1. Why should the sterile field always be kept in sight by the scrub nurse or circulating nurse?
2. Name three health care providers who are considered sterile in the OR area.



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## 1.7 Sterile Procedures and Sterile Attire

Sterile procedures are required before and during specific patient care activities to maintain an area free from microorganisms and to prevent infection. Performing a surgical hand scrub, applying sterile gloves, and preparing a sterile field are ways to prevent and minimize infection during surgeries or invasive procedures.

### **SURGICAL HAND SCRUB**

Skin is a major source of microorganisms and a major source of contamination in the OR setting (CDC, 2010). Since skin cannot be sterilized, members of the surgical team must wear sterile gloves. The purpose of the surgical hand scrub is to significantly reduce the number of skin bacteria found on the hands and arms of the OR staff (Kennedy, 2013). A **surgical hand scrub** is an antiseptic surgical scrub or antiseptic hand rub that is performed prior to donning surgical attire (Perry et al., 2014) and lasts two to five minutes, depending on the product used and hospital policy. Studies have shown that skin bacteria rapidly multiply under surgical gloves if hands are not washed with an antimicrobial soap, whereas a surgical hand scrub will inhibit growth of bacteria under gloved hands (Kennedy, 2013).

### **TYPES OF SURGICAL HAND SCRUBS**


Surgical hand scrub techniques and supplies to clean hands will vary among health care agencies. Most protocols will require a microbial soap-and-water, three- to five-minute hand scrub procedure. Some agencies may use an approved waterless hand scrub product. See Checklist 11 for the steps to follow when scrubbing with medicated soap.



**Checklist 11: Surgical Hand Scrub with Medicated Soap**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- All personnel entering the operating room (OR) or a specific sterile procedure must perform a surgical hand scrub.
- Hands must be free from rings, watches, and bracelets. Nails should be free from any nail enhancements, artificial extenders, acrylics, wraps, and tips. Nail polish must be free from chips or cracks. Research shows that the amount of bacteria is nine times higher on rings and on the skin beneath the fingernails.
- All skin on the forearm and hands (including cuticles) should be free from open lesions and breaks in skin integrity. Any allergies to the cleansing products should be reported to the manager.
- If hands touch anything during cleaning, the entire procedure must be started from the beginning.

| STEPS   | ADDITIONAL INFORMATION   |
|---|--|
| 1. Remove all jewellery.  | Jewellery harbours microorganisms.<br><br><br><i>Remove jewellery</i> |
| 2. No artificial nails, extenders, or chipped nail polish should be worn in the OR. | Artificial nails, extenders, and chipped nail polish can harbour microorganisms.   |
| 3. Inspect hands for sores or abrasions; cover or report to supervisor as required. | Open sores can harbour microorganisms.   |
| 4. Ensure sleeves are at least two to three inches above the elbows.                | This step prevents sleeves from becoming moist.  |

|  |  |
|--|--|
| <p>5. Clean hands with ABHR or soap and water to remove visible debris.</p>  | <p>Hand hygiene is recommended by the Association of periOperative Registered Nurses (AORN).</p>  <p><i>Hand hygiene with ABHR</i></p> |
| <p>6. Turn on water.</p>   | <p>Regulate the temperature of the water. Warm water is recommended to prevent drying out of hands.</p>  <p><i>Wet hands</i></p>       |
| <p>7. Apply the required amount of microbial soap to hands.</p>  | <p>A good amount of soap is required to create lather for a three- to five-minute scrub.</p>   |
| <p>8. Keeping hands above elbows, start timing; scrub each side of each finger, between fingers, under each nail with a nail file, and the back and front of hands for the recommended time, according to agency policy.</p> | <p>Nail files work more effectively than a nail brush. Clean the subungual area (under the fingernails) with a nail file. Nail brushes are not recommended as they may damage the skin around the nail.</p>              |
| <p>9. Scrub the arms, using an up-and-down motion, keeping hands above the elbows at all times. Wash each side of the arm from wrist to elbow for one minute.</p>  | <p>Keeping hands above the wrist allows for the microorganisms to slide off the hands into the sink.</p>   |
| <p>10. Repeat the entire process with the other hand and forearm.</p>  | <p>Use an equal amount of time to wash each hand.</p>  |
| <p>11. With hands raised, rinse hands and arms by passing them through running water, letting the water drip down from the fingertips to the elbow.</p>  | <p>This step allows for all the soap to be rinsed off from cleanest to dirtiest area.</p>  |
| <p>12. Proceed into the operating room (keep hands above the waist), and dry arms using a sterile towel, starting at the fingertips and working down toward the forearms using a dabbing motion.</p>                         | <p>This step prevents contamination of the hands and adheres to the principles of sterile technique.</p>   |
| <p>Data source: ATI, 2015a; Bartlett, Pollard, Bowker, &amp; Bannister, 2002; Kennedy, 2013; WHO, 2009a</p>  |  |

## APPLYING STERILE GLOVES

**Sterile gloves** are gloves that are free from all microorganisms. They are required for any invasive procedure and when contact with any sterile site, tissue, or body cavity is expected (PIDAC, 2012). Sterile gloves help prevent surgical site infections and reduce the risk of exposure to blood and body fluid pathogens for the health care worker. Studies have shown that 18% to 35% of all sterile gloves have tiny holes after surgery, and up to 80% of the tiny puncture sites go unnoticed by the surgeon (Kennedy, 2013). Double gloving is known to reduce the risk of exposure and has become common practice, but does not reduce the risk of cross-contamination after surgery (Kennedy, 2013).


To apply sterile gloves, follow the steps in Checklist 12.




**Checklist 12: Donning Sterile Gloves**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- Choose the right size of gloves. Gloves come in multiple sizes. Make sure the gloves are tight enough so that objects are easy to pick up.
- Sterile gloving does not replace hand washing. Hands must be washed before and after any procedure.
- Gather all supplies and prepare your patient for the procedure prior to applying gloves.
- Ensure the patient does not have a latex allergy prior to applying sterile gloves.

| STEPS  | ADDITIONAL INFORMATION  |
|--|---|
| 1. Remove all jewellery.   | <p>Jewellery harbours more microorganisms than do hands.</p>  <p><i>Remove jewellery</i></p> |
| 2. No artificial nails, extenders, or chipped nail polish should be worn.            | Artificial nails, extenders, and chipped nail polish can harbour additional microorganisms.   |
| 3. Inspect hands for sores and abrasions. Cover or report to supervisor as required. | Open sores can harbour microorganisms.  |
| 4. Ensure sleeves are at least two to three inches above the elbows.                 | This step prevents sleeves from becoming moist, and prevents the transfer of microorganisms from the sleeves.   |

|  |  |
|--|--|
| <p>5. Clean hands with ABHR or soap and water.</p>                                 | <p>This step decreases the bacterial count on hands and prevents contamination of sterile equipment.</p>  <p><i>Hand hygiene with ABHR</i></p>   |
| <p>6. Clean surface to open sterile field and raise its height to waist level.</p> | <p>All sterile items must be kept above waist level.</p>   |
| <p>7. Inspect packaging for sterility.</p>   | <p>All sterile items must be checked for sterility prior to use. Always examine sterile glove packaging for expiry date, intactness, and tears. The package should be dry. Sterile gloves have outer packaging that must be removed prior to starting the procedure of applying sterile gloves.</p>  <p><i>Inspect outer packaging</i></p> |
| <p>8. Open sterile packaging by peeling open the top seam and pulling down.</p>    | <p>Open sterile packaging without contaminating inner package.</p>  <p><i>Open sterile glove packaging</i></p>   |

9. Place inner package on working surface and open up to see right and left gloves. Start with dominant hand first. Open packaging.

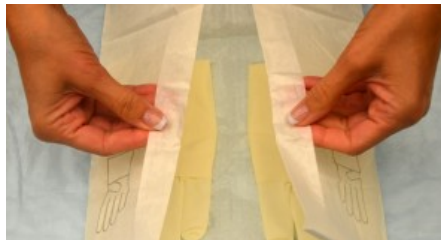
This step prepares sterile surface to perform sterile application of gloves.



*Place inner packaging on clean surface*



*Start with dominant hand*



*Open packaging*

10. Pick up glove for dominant hand by touching the inside cuff of the glove. Do not touch the outside of the glove. Pull glove completely over dominant hand.

This step allows ease of application.



*Grasp the glove of the dominant hand*



*Insert hand into opening*



*Pull glove on up to wrist*

11. Insert gloved hand into the cuff of the remaining glove. Pull remaining glove on non-dominant hand and insert fingers. Adjust gloves if necessary.

This ensures proper fit of gloves.



*Place gloved hand under the cuff*



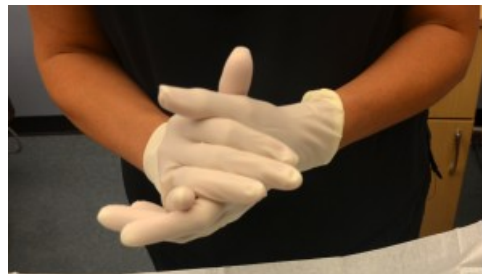
*Insert fingers*



*Pull glove up to wrist*

12. Once gloves are on, interlock gloved hands and keep at least six inches away from clothing, keeping hands above waist level and below the shoulders.

This step prevents the accidental touching of non-sterile objects or the front of the gown.



*Keep hands above waist level and away from clothing*

13. To remove gloves, grasp the outside of the cuff or palm of glove and gently pull the glove off, turning it inside out and placing it into gloved hand.

Doing this, prevents the contamination of the hand when removing glove.



*Grasp the outside of the glove 1/2 inch below the cuff*



*Turn glove inside out*



*Place inside-out glove in gloved hand*

14. Take ungloved hand, place fingers inside the other glove, and pull glove off inside out.

This step prevents the contamination of gloved hand touching ungloved hand.



*Insert finger under the cuff*



*Remove second glove inside out*

15. [Perform hand hygiene.](#)

This removes powder from the gloves, which can irritate the skin; it also prevents contamination from potential pinholes in the gloves.



*Hand hygiene with ABHR*

Data source: ATI, 2015b; Berman & Snyder, 2016; Kennedy, 2013; Perry et al., 2014; Rothrock, 2014

VIDEO 1.3

Watch the video [Applying Sterile Gloves](#) by [Renée Anderson & Wendy McKenzie](#), Thompson Rivers University.

[Watch this Donning Sterile Gloves video](#) for a demonstration on donning sterile gloves.

## SETTING UP A STERILE FIELD

Aseptic procedures require a sterile area in which to work with sterile objects. A **sterile field** is a sterile surface on which to place sterile equipment that is considered free from microorganisms (Perry et al., 2014). A sterile field is required for all invasive procedures to prevent the transfer of microorganisms and reduce the potential for surgical site infections. Sterile fields can be created in the OR using drapes, or at the bedside using a prepackaged set of supplies for a sterile procedure or wound care. Many sterile kits contain a waterproof inner drape that can be set up as part of the sterile field. Sterile items can be linen wrapped or paper wrapped, depending on whether they are single- or multi-use. Always check hospital policy and doctor orders if a sterile field is required for a procedure. See Checklist 13 for the steps for preparing a sterile field.

**Checklist 13: Preparing a Sterile Field**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- Check physician orders and hospital policy regarding procedure.
- Instruct patient how to assist throughout the procedure (e.g., lying still, not talking over the sterile field or touching sterile objects).
- If required, check dressing on wound to assess for required supplies needed for the procedure.
- Offer analgesic and/or bathroom to ensure patient comfort throughout the procedure.
- Explain procedure to the patient and give an approximate time frame for completing the procedure.

**STEPS**



**ADDITIONAL INFORMATION**

1. [Perform hand hygiene](#), gather supplies, check equipment for sterility, and gather additional supplies (gauze, sterile cleaning solution, sterile gloves, etc.).

Gathering additional supplies at the same time will help avoid leaving the sterile field unattended. Prepackaged sterile kits may not have all the supplies required for each procedure.

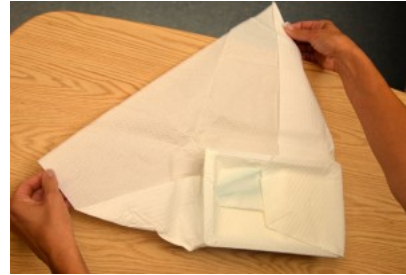


*Hand hygiene with ABHR*

|  |   |
|--|---|
| <p>2. Place package on clean, dry, waist-level table.</p>  | <p>A clean, dry surface is required to set up a sterile field.</p> <p>Items below waist level are considered contaminated.</p> <p>Prepare sterile field as close to the time of procedure as possible.</p>  <p><i>Place package on waist-high, dry, clean surface</i></p>                                 |
| <p>3. Remove the outside sterile packaging and discard.</p>  | <p>This allows more space to set up a sterile field.</p>  |
| <p>4. Grab the outer surface's outermost tip (corner of folded drape) and open the flap away from you.</p> | <p>The one-inch border on the sterile field is considered non-sterile. Make sure your arm is not over the sterile field.</p> <p>The inside of the sterile packaging is your sterile drape.</p> <p>Stand away from your sterile field when opening sterile packaging.</p>  <p><i>Open first flap</i></p> |

5. Grab the side flaps and open outwards, and let it lie flat on the table.

Touch only the one-inch border on the sterile field. Do not reach over the sterile field.



*Second flap*



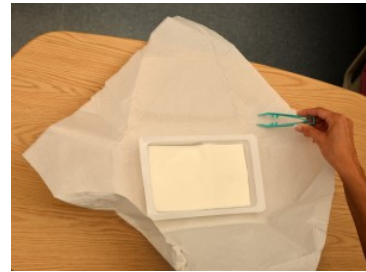
*Third flap*

6. Grasping the outermost corner, pull the last flap toward you, and lay it flat on the table.

This step creates an open sterile field.



*Remove forceps prior to opening last flap*



*Open last flap towards you*

7. Using sterile forceps, rearrange sterile equipment on the sterile field in order of usage.

This step saves time for completing sterile procedure; it also limits the amount of time the sterile field is exposed to air.



*Arrange sterile items on field*



*Sterile field*

**ADDING STERILE ITEMS TO A STERILE FIELD**

8. Supplies can be opened (following packaging directions), then gently dropped onto the sterile field.

Gently drop items onto the sterile field or use sterile forceps to place sterile items onto the field.

If using equipment wrapped in linen, ensure sterility by checking the tape for date and to view chemical indicator (stripes on the tape ensure sterility has been achieved).

When using paper-wrapped items, they should be dry and free from tears. Confirm expiry date.

Do not flip or toss objects onto the sterile field.



*Add sterile items to sterile field*

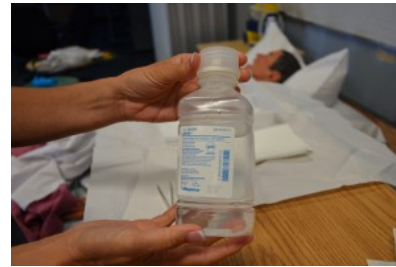


*Add sterile supplies*

9. Add solution to the sterile tray by pouring the solution carefully into the receptacle:

- Verify solution and expiry date.
- Open cap and place face up on non-sterile surface.
- Hold bottle two inches above receptacle and pour the required amount slowly and without splashing.
- If bottle is multi-use, recap and label it with the date and time of opening. Most sterile solutions are good for 24 hours.

Do not touch the edge of the solution receptacle. Place the receptacle near the edge of the sterile field.



*Sterile solution*



*Add sterile solution to the sterile field*

This ensures the sterility of the solution and the use of the correct solution.

It also ensures the bottle of solution does not come in contact with the sterile field.

Lastly, it verifies the type of solution required for the procedure.

Be careful not to drip solution onto the sterile field, causing contamination. (When liquid permeates a sterile field it is called strike through.)

Data source: ATI, 2015c; Berman & Snyder, 2016; Kennedy, 2013; Perry et al., 2014; Rothrock, 2014

[Read this \*Surgical Aseptic Technique and Sterile Field PDF\*](#) for information about surgical asepsis and setting up a sterile field at the bedside.

[Watch this \*Medical Assistant Training Prepare for Minor Surgical Procedures video\*](#) to see how to set up a sterile field.

## STERILE ATTIRE IN THE OR

Wearing sterile surgical attire (sterile gowns, closed gloving, and masks) and PPE is essential to keep the restricted and semi-restricted areas clean and to minimize sources of microbial transmission and contamination. It is important to minimize the patient's exposure to the surgical team's skin, mucous membranes, and hair by the proper application of surgical attire. An extensive list of recommendations for surgical attire can be located on the Association of periOperative Registered Nurses (AORN) website at [Recommendations for surgical attire](#) (Braswell & Spruce, 2012).

### Critical Thinking Exercises

1. Name four differences between a medical hand wash with soap and water and a surgical hand scrub.
2. When preparing a sterile field, is the first flap open toward the health care provider or away from the health care provider?
3. Name two reasons for performing hand hygiene before and after applying sterile gloves.



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## 1.8 Summary

Infection control and prevention practices are a critical component of patient safety in the health care environment. In order to protect the public and cut health care costs, all health care professionals must take part in preventing infections before they occur. The use of routine practices, effective hand hygiene techniques, additional precautions, and sterile procedures contribute to enhancing patient safety and eliminating significant health care risks such as health care-associated infections. If effectively applied, infection control and prevention practices will prevent and minimize transmission of infections in health care settings.

### Key Takeaways

- Hand hygiene is the single most important part of infection prevention and control practices in the health care setting.
- Plan your care: each health care worker is responsible to perform a risk assessment before every contact with a patient and/or patient's environment to ensure the proper control measures are in place to prevent transmission of infections.
- The most common sites for HAIs are the urinary tract and the respiratory tract. It is vital to implement preventive measures at all times during patient care or during procedures related to these areas.
- Be aware of potential risk factors of patients that make them more susceptible to infections. Susceptible patients include very young children; patients who are elderly, nutritionally deficient, or chronically ill; patients undergoing medical treatments such as chemotherapy or taking medications such as high doses of steroids; and individuals who are already ill or have open wounds (Perry et al., 2014).
- Be aware how the chain of infection works and implement ways to break the chain of infection in practice.
- Practise strict adherence to the principles of sterile technique to prevent and minimize infections during sterile and invasive procedures.

### SUGGESTED ONLINE RESOURCES

1. [BC Centre for Disease Control: Blood and body fluid exposure management](#). This resource outlines risk assessment and guidelines for potential exposures of percutaneous, permucosal, and non-intact skin to HIV, hepatitis B, and hepatitis C.
2. [British Columbia: Home and community care – Policy manual](#). This manual offers guidelines for working in the community and residential care.
3. [Centers for Disease Control and Prevention: Antibiotic/antimicrobial resistance](#). This

resource covers common viruses/bacteria found in the health care setting, such as:

- *Clostridium difficile* infection (CDI)
  - Carbapenemase-producing organisms (CPO)
  - Multi-drug-resistant organisms (MDRO) or antibiotic-resistant organisms (ARO): MRSA/VRE
  - Severe acute respiratory syndrome (SARS)
  - Middle East respiratory syndrome (MERS)
  - [Ebola virus disease](#) (EVD)
4. [Centers for Disease Control and Prevention: Guidelines for disinfection and sterilization in healthcare facilities](#). The goal of this document is to reduce the rates of health care associated infections. Each recommendation listed is categorized according to scientific evidence, theoretical rationale, and applicability.
  5. [Infection and Prevention Control Canada. \(IPAC\): Evidence-based guidelines](#). This website offers the latest reports, guidelines, standards, and policies related to infection control issues. U.S. and international resources are also provided. These documents may be used to support your own documentation practice and best practices.
  6. [Ontario Agency for Health Protection and Promotion: Routine practices and additional precautions](#). This excellent resource provides routine practice and additional precautions in all health care settings. These were developed by the Ontario Provincial Infectious Disease Advisory Committee (PIDAC) on Infection Prevention and Control (IPC).
  7. [Provincial Infection Control Network of British Columbia \(PICNet\): BC infection control and hand hygiene module](#). This course teaches the basic principles of infection control in the health care system, sharps management, hand hygiene, blood and body fluid exposure and cleanup, the proper use of personal protective equipment, and isolation precautions.
  8. [Provincial Infection Control Network of British Columbia \(PICNet\): Infection control guidelines. Providing health care to the client living in the community. PICNet Educational Links](#). This document is intended to provide guidance in the writing of policies pertaining to infection prevention and control within community health care, and home care programs and settings.
  9. [Public Health Agency of Canada: Hand hygiene practices in healthcare settings](#). This excellent Canadian resource covers infectious disease prevention and control policies.
  10. [World Health Organization: Clean care is safer care](#). This website provides links to the five moments in hand hygiene, diagrams on hand washing and hand rubs, and leaflets for teaching.

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## Chapter 2. Patient Assessment



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## 2.1 Introduction

Systematic health assessments are performed regularly in nearly every health care setting. For example:

- A health history is taken when a patient is admitted and whenever additional subjective information is required to inform care.
- Comprehensive head-to-toe assessments are done when a patient is admitted, at the beginning of each shift, and when it is determined to be necessary by the patient's hemodynamic status and context.
- Brief physical assessments are done as necessary and to identify changes in a patient's status and for comparison with the previous assessment.
- Focused assessments are done in response to a specific problem recognized by the assessor as needing further assessment of a body system.
- Emergency assessments are done in emergency situations.

A routine physical assessment reveals information to supplement a patient's database. The assessment is documented according to agency policy, and unusual findings are reported to appropriate members of the health care team. Ongoing, objective, and comprehensive assessments promote continuity in health care.

The ability to think critically and interpret patient behaviours and physiologic changes is essential. The skills of physical assessment are powerful tools for detecting both subtle and obvious changes in a patient's health. The assessment skills outlined in this chapter are meant to provide a framework to develop assessment competencies applicable and salient to everyday practice as recommended by Anderson, Nix, Norman, and McPike (2014).

### Learning Objectives

Physical assessment objectives include being able to:

- Describe the purposes of physical assessment
- Describe the different types of assessment and when they should be used to inform care
- Discuss techniques to promote a patient's physical and psychological comfort during an examination
- Make environmental preparations before an assessment
- Identify data to collect from the nursing history before an examination
- Incorporate health promotion and health teaching into an assessment
- Use physical assessment techniques and skills during routine nursing care

- Document assessment findings according to agency policy
- Communicate abnormal findings to appropriate members of the health care team

---

## 2.2 Pain Assessment

“Pain is whatever the experiencing person says it is, existing whenever the experiencing person says it does” (McCaffery, 1968, cited in Rosdahl & Kowalski, 2007, p. 704). Pain is a subjective experience, and self-report of pain is the most reliable indicator of a patient’s experience. Determining pain is an important component of a physical assessment, and pain is sometimes referred to as the “fifth vital sign.”



*Figure 2.1 Example of a pain scale*

Pain assessment is an ongoing process rather than a single event (see Figure 2.1). A more comprehensive and focused assessment should be performed when someone’s pain changes notably from previous findings, because sudden changes may indicate an underlying pathological process (Jarvis, Browne, MacDonald-Jenkins, & Luctkar-Flude, 2014).

Always assess pain at the beginning of a physical health assessment to determine the patient’s comfort level and potential need for pain comfort measures. At any other time you think your patient is in pain, you can use the mnemonic LOTTAARP (location, onset, timing, type, associated symptoms, alleviating factors, radiation, precipitating event) to help you remember what questions to ask your patient. See Checklist 14 for the questions to ask and steps to take to assess pain.

**Checklist 14: Pain Assessment**

| <i>Disclaimer: Always review and follow your hospital policy regarding this specific skill.</i>   |   |
|---|---|
| STEPS   | ADDITIONAL INFORMATION  |
| 1. Start your assessments by asking patients to rate their pain on a scale from 0 to 10, with 10 being the worst possible pain and 0 being no pain. |   |
| L: Location   | Where are you feeling pain?   |
| O: Onset  | When did the pain start?<br>How long have you been in pain?   |
| T: Timing   | Is the pain constant or intermittent?<br>Has the intensity changed over time?                             |
| T: Type   | What does the pain feel like?   |
| A: Associated symptoms  | Do you have any associated symptoms such as nausea, vomiting, fever, etc.?                                |
| A: Alleviating factors  | What makes the pain feel better?<br>Do you take any medications for this pain? If so, are they effective? |
| R: Radiation  | Does the pain move anywhere else?   |
| P: Precipitating event  | What was happening when the pain started? What has caused the pain to occur?<br>Has this happened before? |
| 2. Provide analgesia as prescribed and other comfort measures, such as distraction, massage, and the application of warmth or cold, as appropriate. |   |
| 3. Report and document assessment findings and related health problems according to agency policy.  |   |
| Data source: Assessment Skill Checklists, 2014  |   |

Read this section on [vital signs](#) to learn how to take a full set of vital signs.

### Critical Thinking Exercises

1. You are caring for a patient who has just returned from a surgical procedure. The patient has a history of chronic pain. Would the patient's assessment provide the same data as an assessment of a person who does not have a history of chronic pain?
2. What is more important: the subjective or the objective data in a pain assessment?

### ATTRIBUTION

#### Figure 2.1

[Children's pain scale](#) by Robert Weis is used under a [CC BY SA 4.0](#) licence.





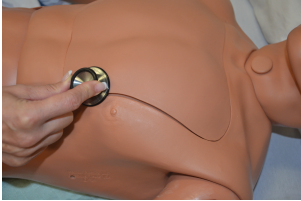
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## 2.3 Vital Signs

Temperature, pulse, respiration, blood pressure (BP), and oxygen saturation, are measurements that indicate a person's hemodynamic status. These are the five vital signs most frequently obtained by health care practitioners (Perry, Potter, & Ostendorf, 2014). Vital signs will potentially reveal sudden changes in a patient's condition and will also measure changes that occur progressively over time. A difference between patients' normal baseline vital signs and their present vital signs may indicate the need for intervention (Perry et al., 2014). Checklist 15 outlines the steps to take when checking vital signs.

**Checklist 15: Vital Signs**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

| STEPS  | ADDITIONAL INFORMATION  |
|--|---|
| <p>1. Temperature:</p>    | <p>Normal (oral) = 35.8°C to 37.3°C</p> <p>Oral temperature: Place the thermometer in the mouth under the tongue and instruct patient to keep mouth closed. Leave the thermometer in place for as long as is indicated by the device manufacturer.</p> <p>Axillary temperature: Usually 1°C lower than oral temperature. Place the thermometer in patient's armpit and leave it in place for as long as is indicated by the device manufacturer.</p> <p>Tympanic membrane (ear) temperature: Usually 0.3°C to 0.6°C higher than an oral temperature. The tympanic membrane shares the same vascular artery that perfuses the hypothalamus. Do not force the thermometer into the ear and do not occlude the ear canal.</p> <p>Rectal temperature: Usually 1°C higher than oral temperature. Use only when other routes are not available.</p> |
| <p>2. Pulse:</p> <p>Normal resting heart rate = 60 to 100 beats per minute</p>  <p><i>Radial pulse</i></p>  <p><i>Apical pulse</i></p> | <p>Radial pulse: Use the pads of your first three fingers to gently palpate the radial pulse at the inner lateral wrist.</p> <p>Apical pulse: Taken as part of a focused cardiovascular assessment and when the pulse rate is irregular. Apical heart rate should be used as the parameter indicated in certain cardiac medications (e.g., digoxin). Apical pulse rate should be taken for a full minute for accuracy, and is located at the fifth intercostal space in line with the middle of the clavicle in adults.</p> <p>Carotid pulse: May be taken when radial pulse is not present or is difficult to palpate.</p>   |

|   |  |
|---|--|
| <p>3. Respiration rate:</p> <p>Normal resting respiratory rate = 10 to 20 breaths per minute</p>  <p><i>Respiratory rate</i></p>                                     | <p>Count respiratory rate unobtrusively while you are taking the pulse rate so that the patient is not aware that you are taking the respiration rate. Count for 30 seconds or for a full minute if irregular.</p>   |
| <p>4. Blood pressure (BP):</p>  <p><i>Blood pressure cuff</i></p> <p>The average BP for an adult is 120/80 mmHg, but variations are normal for various reasons.</p> | <p>The systolic pressure is the maximum pressure on the arteries during left ventricular contraction.</p> <p>The diastolic pressure is the resting pressure on the arteries between each cardiac contraction.</p> <p>The patient may be sitting or lying down with the bare arm at heart level. Palpate the brachial artery just above the antecubital fossa medially. Wrap the BP cuff around the upper arm about 2.5 cm above the brachial artery.</p> <p>Palpate the radial or brachial artery, and inflate the BP cuff until the pulse rate is no longer felt. Then inflate 20 to 30 mmHg more.</p> <p>Place the bell of the stethoscope over the brachial artery, and deflate the cuff slowly and evenly, noting the points at which you hear the first appearance of sound (systolic BP), and the disappearance of sound (diastolic BP).</p> |
| <p>5. Oxygen saturation (SpO<sub>2</sub>):</p> <p>A healthy patient will have an SpO<sub>2</sub> of ≥ 97%.</p>  <p><i>Pulse oximeter sensor</i></p>                | <p>A pulse oximeter sensor attached to the patient's finger or earlobe measures light absorption of hemoglobin and represents arterial SpO<sub>2</sub>.</p>  |
| <p>Data source: Jarvis et al., 2014; Stephen, Skillen, Day, &amp; Jensen, 2012</p>  |  |

### Critical Thinking Exercises

1. Which type of thermometer is the best example of a non-invasive, safe, and efficient tool for measuring temperature?
2. A 40-year-old male patient has a blood pressure of 140/100 mmHg. Is this normal for this patient? What additional data would you need to collect before making a decision about care for this patient?

---

## 2.4 Health History

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. The health history is typically done on admission to hospital, but a health history may be taken whenever additional subjective information from the patient may be helpful to inform care (Wilson & Giddens, 2013).

Data gathered may be subjective or objective in nature. Subjective data is information reported by the patient and may include signs and symptoms described by the patient but not noticeable to others. Subjective data also includes demographic information, patient and family information about past and current medical conditions, and patient information about surgical procedures and social history. Objective data is information that the health care professional gathers during a physical examination and consists of information that can be seen, felt, smelled, or heard by the health care professional. Taken together, the data collected provides a health history that gives the health care professional an opportunity to assess health promotion practices and offer patient education (Stephen et al., 2012).

The hospital will have a form with assessment questions similar to the ones listed in Checklist 16.

**Checklist 16: Health History Checklist**

| <i>Disclaimer: Always review and follow your hospital policy regarding this specific skill.</i> |   |
|---|---|
| STEPS   | ADDITIONAL INFORMATION  |
| <p>Determine the following:</p> <p>1. Biographical data</p>                                     | <ul style="list-style-type: none"> <li>• Source of history</li> <li>• Name</li> <li>• Age</li> <li>• Occupation (past or present)</li> <li>• Marital status/living arrangement</li> </ul>   |
| <p>2. Reason for seeking care and history of present health concern</p>                         | <ul style="list-style-type: none"> <li>• Chief complaint</li> <li>• Onset of present health concern</li> <li>• Duration</li> <li>• Course of the health concern</li> <li>• Signs, symptoms, and related problems</li> <li>• Medications or treatments used (ask how effective they were)</li> <li>• What aggravates this health concern</li> <li>• What alleviates the symptoms</li> <li>• What caused the health concern to occur</li> <li>• Related health concerns</li> <li>• How the concern has affected life and daily activities</li> <li>• Previous history and episodes of this condition</li> </ul> |
| <p>3. Past health history</p>   | <ul style="list-style-type: none"> <li>• Allergies (reaction)</li> <li>• Serious or chronic illness</li> <li>• Recent hospitalizations</li> <li>• Recent surgical procedures</li> <li>• Emotional or psychiatric problems (if pertinent)</li> <li>• Current medications: prescriptions, over-the-counter, herbal remedies</li> <li>• Drug/alcohol consumption</li> </ul>  |

|   |  |
|---|--|
| 4. Family history   | <ul style="list-style-type: none"> <li>• Pertinent health status of family members</li> <li>• Pertinent family history of heart disease, lung disease, cancer, hypertension, diabetes, tuberculosis, arthritis, neurological disease, obesity, mental illness, genetic disorders</li> </ul>                                      |
| 5. Functional assessment (including activities of daily living) | <ul style="list-style-type: none"> <li>• Activity/exercise, leisure and recreational activities (assess for falls risk)</li> <li>• Sleep/rest</li> <li>• Nutrition/elimination</li> <li>• Interpersonal relationships/resources</li> <li>• Coping and stress management</li> <li>• Occupational/environmental hazards</li> </ul> |
| 6. Developmental tasks  | <ul style="list-style-type: none"> <li>• Current significant physical and psychosocial changes/issues</li> </ul>   |
| 7. Cultural assessment  | <ul style="list-style-type: none"> <li>• Cultural/health-related beliefs and practices</li> <li>• Nutritional considerations related to culture</li> <li>• Social and community considerations</li> <li>• Religious affiliation/spiritual beliefs and/or practices</li> <li>• Language/communication</li> </ul>                  |
| Data source: Assessment Skill Checklists, 2014                  |  |

### Critical Thinking Exercises

1. You are taking a health history. Why is it important for you to obtain a complete description of the patient's present illness?
2. You are taking a health history. What is one reason it is important for you to obtain a complete description of the patient's lifestyle and exercise habits?



---

## 2.5 Head-to-Toe Assessment

A comprehensive head-to-toe assessment is done on patient admission, at the beginning of each shift, and when it is determined to be necessary by the patient's hemodynamic status and the context. The head-to-toe assessment includes all the body systems, and the findings will inform the health care professional on the patient's overall condition. Any unusual findings should be followed up with a [focused assessment](#) specific to the affected body system.

A physical examination involves collecting objective data using the techniques of inspection, palpation, percussion, and auscultation as appropriate (Wilson & Giddens, 2013). Checklist 17 outlines the steps to take.

**Checklist 17: Head-to-Toe Assessment**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [contact precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Explain process to patient.
- Be organized and systematic in your assessment.
- Use appropriate listening and questioning skills.
- Listen and attend to patient cues.
- Ensure patient’s privacy and dignity.
- Assess [ABCCS](#) (airway, breathing, circulation, consciousness, safety)/suction/oxygen/safety.
- Apply principles of [asepsis and safety.](#)
- Check [vital signs.](#)
- Complete necessary [focused assessments.](#)

**STEPS**

**ADDITIONAL INFORMATION**


1. General appearance:

- Affect/behaviour/anxiety
- Level of hygiene
- Body position
- Patient mobility
- Speech pattern and articulation

Alterations may reflect neurologic impairment, oral injury or impairment, improperly fitting dentures, differences in dialect or language, or potential mental illness. Unusual findings should be followed up with a [focused neurological system assessment.](#)



*Assess general appearance*

|  |  |
|--|--|
| <p><b><i>This is not a specific step. Evaluating the skin, hair, and nails is an ongoing element of a full body assessment as you work through steps 3-9.</i></b></p> <p>2. Skin, hair, and nails:</p> <ul style="list-style-type: none"> <li>• Inspect for lesions, bruising, and rashes.</li> <li>• Palpate skin for temperature, moisture, and texture.</li> <li>• Inspect for pressure areas.</li> <li>• Inspect skin for edema.</li> <li>• Inspect scalp for lesions and hair and scalp for presence of lice and/or nits.</li> <li>• Inspect nails for consistency, colour, and <b>capillary refill</b>.</li> </ul> | <p>Check for and follow up on the presence of lesions, bruising, and rashes. Variations in skin temperature, texture, and perspiration or dehydration may indicate underlying conditions.</p> <p>Redness of the skin at pressure areas such as heels, elbows, buttocks, and hips indicates the need to reassess patient's need for position changes.</p> <p>Unilateral edema may indicate a local or peripheral cause, whereas bilateral-pitting edema usually indicates cardiac or kidney failure.</p> <p>Check hair for the presence of lice and/or nits (eggs), which are oval in shape and adhere to the hair shaft.</p> |
| <p>3. Head and neck:</p> <ul style="list-style-type: none"> <li>• Inspect eyes for drainage.</li> <li>• Inspect eyes for pupillary reaction to light.</li> <li>• Inspect mouth, tongue, and teeth for moisture, colour, dentures.</li> <li>• Inspect for facial symmetry.</li> </ul>   | <p>Check eyes for drainage, pupil size, and reaction to light. Drainage may indicate infection, allergy, or injury.</p> <p>Slow pupillary reaction to light or unequal reactions bilaterally may indicate neurological impairment.</p>  <p><i>Check pupillary reaction to light</i></p> <p>Dry mucous membranes indicate decreased hydration.</p> <p>Facial asymmetry may indicate neurological impairment or injury. Unusual findings should be followed up with a <a href="#">focused neurological system assessment</a>.</p>           |

4. Chest:

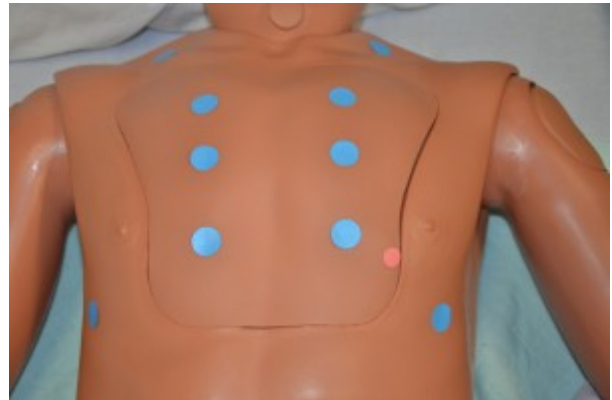
- Inspect:
  - Expansion/retraction of chest wall/work of breathing and/or accessory muscle use
  - Jugular distension
- Auscultate:
  - For breath sounds anteriorly and posteriorly
  - Apices and bases for any adventitious sounds
  - Apical heart rate
- Palpate:
  - For symmetrical lung expansion

Chest expansion may be asymmetrical with conditions such as atelectasis, pneumonia, fractured ribs, or pneumothorax.

Use of accessory muscles may indicate acute airway obstruction or massive atelectasis.

Jugular distension of more than 3 cm above the sternal angle while the patient is at 45° may indicate cardiac failure.

The presence of crackles or wheezing must be further assessed, documented, and reported. Unusual findings should be followed up with a [focused respiratory assessment](#).



*Auscultate anterior chest; blue dots indicate stethoscope placement for auscultation*



*Auscultate posterior chest; blue dots indicate stethoscope placement for auscultation*



*Auscultate apical pulse at the fifth intercostal space and midclavicular line*

Note the heart rate and rhythm, identify S1 and S2, and follow up on any unusual findings with a [focused cardiovascular assessment](#).

5. Abdomen:

- Inspect:
  - Abdomen for distension, asymmetry
- Auscultate:
  - Bowel sounds (RLQ)
- Palpate:
  - Four quadrants for pain and bladder/bowel distension (light palpation only)
- Check urine output for frequency, colour, odour.
- Determine frequency and type of bowel movements.

Abdominal distension may indicate ascites associated with conditions such as heart failure, cirrhosis, and pancreatitis. Markedly visible peristalsis with abdominal distension may indicate intestinal obstruction.

Hyperactive bowel sounds may indicate bowel obstruction, gastroenteritis, or subsiding paralytic ileum.

Hypoactive or absent bowel sounds may be present after abdominal surgery, or with peritonitis or paralytic ileus.

Pain and tenderness may indicate underlying inflammatory conditions such as peritonitis.

Unusual findings in urine output may indicate compromised urinary function. Follow up with a [focused gastrointestinal and genitourinary assessment](#).

Unusual findings with bowel movements should be followed up with a [focused gastrointestinal and genitourinary assessment](#).



*Auscultate abdomen*



## 6. Extremities:

- Inspect:
  - Arms and legs for pain, deformity, edema, pressure areas, bruises
  - Compare bilaterally
- Palpate:
  - Radial pulses
  - Pedal pulses: dorsalis pedis and posterior tibial
  - CWMS and capillary refill (hands and feet)
- Assess handgrip strength and equality.
- Assess dorsiflex and plantarflex feet against resistance (note strength and equality).
- Check skin integrity and pressure areas.

Limitation in range of movement may indicate articular disease or injury.

Palpate pulses for symmetry in rate and rhythm. Asymmetry may indicate cardiovascular conditions or post-surgical complications.

Unequal handgrip and/or foot strength may indicate underlying conditions, injury, or post-surgical complications.

**CWMS:** colour, warmth, movement, and sensation of the hands and feet should be checked and compared to determine adequacy of perfusion.

Check skin integrity and pressure areas, and ensure follow-up and in-depth assessment of patient mobility and need for regular changes in position.



*Assess dorsiflexion*



*Assess plantarflexion*



*Assess CWMS – colour, warmth, movement, and sensation*



*Assess bilateral hand strength*

Palpate and inspect capillary refill and report if more than 3 seconds.



*Assess pedal pulses*



*Check capillary refill*

To check capillary refill, depress the nail edge to cause blanching and then release. Colour should return to the nail instantly or in less than 3 seconds. If it takes longer, this suggests decreased peripheral perfusion and may indicate cardiovascular or respiratory dysfunction. Unusual findings should be followed up with a [focused cardiovascular assessment](#).

**Clubbing** of nails, in which the nails present as straightened out to 180 degrees, with the nail base feeling spongy, occurs with heart disease, emphysema, and chronic bronchitis.

7. Back area (turn patient to side or ask to sit up or lean forward):

- Inspect back and spine.
- Inspect coccyx/buttocks.

Check for curvature or abnormalities in the spine.

Check skin integrity and pressure areas, and ensure follow-up and in-depth assessment of patient mobility and need for regular changes in position.

8. Tubes, drains, dressings, and IVs:

- Inspect for drainage, position, and function.
- Assess wounds for unusual drainage.

Note amount, colour, and consistency of drainage (e.g., Foley catheter), or if infusing as prescribed (e.g., intravenous).



*Urinary catheter bag*

Assess wounds for large amounts of drainage or for purulent drainage, and provide [wound care](#) as indicated.

9. Mobility:

- Check if full or partial weight-bearing.
- Determine gait/balance.
- Determine need for and use of assistive devices.

Assess patient's risk for falls. Document and follow up any indication of falls risk. Note use of mobility aids and ensure they are available to the patient on ambulation.



*Patient position prior to standing*

|   |   |
|---|---|
| 10. Report and document assessment findings and related health problems according to agency policy. | Accurate and timely documentation and reporting promote patient safety. |
| Data source: Assessment Skill Checklists, 2014; Jarvis et al., 2014; Stephen et al., 2012           |   |

### Critical Thinking Exercises

1. You are assessing a patient at the beginning of your shift. Which assessment would be the most appropriate?
2. You come back from a break to find your patient complaining that she feels short of breath. Which assessment would be the most appropriate?



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## 2.6 Initial and Emergency Assessment

The ABCCS assessment (airway, breathing, circulation, consciousness, safety) is the first assessment you will do when you meet your patient. This assessment is repeated whenever you suspect or recognize that your patient's status has become, or is becoming, unstable.

For example, if you assess that your patient is short of breath (dyspneic) with an increased respiration rate (tachypneic), then you should proceed with an ABCCS assessment and a focused respiratory assessment with appropriate interventions.

The ABCCS assessment includes the steps in Checklist 18.

**Checklist 18: Initial and Emergency Assessment**

| <i>Disclaimer: Always review and follow your hospital policy regarding this specific skill.</i>   |   |
|---|---|
| STEPS   | ADDITIONAL INFORMATION  |
| <p>A – Airway</p> <ul style="list-style-type: none"> <li>• Is the patient’s airway compromised?</li> </ul>  | <p>Does the patient’s position need to be changed?</p> <p>If patient is choking on thick secretions, consider oral suctioning (check suction equipment).</p>  |
| <p>B – Breathing</p> <ul style="list-style-type: none"> <li>• Assess rate and ease of breathing.</li> <li>• Assess the effectiveness of the oxygen delivery.</li> </ul>   | <p>Is the oxygen flow connection intact? Is the rate, flow, and percentage as ordered?</p> <p>Based on your assessment, consider the need for potential oxygen supplementation.</p>   |
| <p>C – Circulation</p> <ul style="list-style-type: none"> <li>• Assess for the presence of a radial pulse.</li> <li>• Assess skin colour, moisture, and temperature for signs of decreased tissue perfusion (pale, dusky, cool, or clammy skin).</li> </ul> | <p>Note whether the pulse is too fast, too slow, or absent.</p> <p>If a radial pulse is not detectable, check for a carotid pulse.</p> <p>If no pulse is present, call for help and start CPR.</p>  |
| <p>C – Consciousness</p> <ul style="list-style-type: none"> <li>• Check the patient’s level of consciousness (LOC).</li> </ul>  | <p>Is the patient alert, drowsy, disoriented, restless, agitated, unconscious?</p> <p>Note if there is a change from the patient’s normal or previously noted LOC.</p>  |
| <p>S – Safety</p> <ul style="list-style-type: none"> <li>• Ensure the patient is safe and free from risk of harm or injury at all times.</li> </ul>   | <p>Check for name band and allergy band.</p> <p>Check oxygen saturation level.</p> <p>Check that suction is working.</p> <p>Check brakes on the bed, bedrail position (up, if required), bed is at the appropriate level, and call bell is within reach.</p> <p>Are there any fall risk indicators?</p> <p>Are there any dysphagia (difficulty swallowing) guidelines, or should there be some requested?</p> |
| Report and document assessment findings and related health problems according to agency policy.   |   |
| Data source: Assessment Skill Checklists, 2014  |   |

### Critical Thinking Exercises

1. Initial assessment of your patient reveals that the patient is having trouble speaking. What would be your next steps?
2. What is included in the safety check on your unit? Is there anything that is not listed here?



## 2.7 Focused Assessments

Health care professionals do focused assessments in response to a specific patient health problem recognized by the assessor as needing further assessment of a body system or systems.

### FOCUSED RESPIRATORY SYSTEM ASSESSMENT

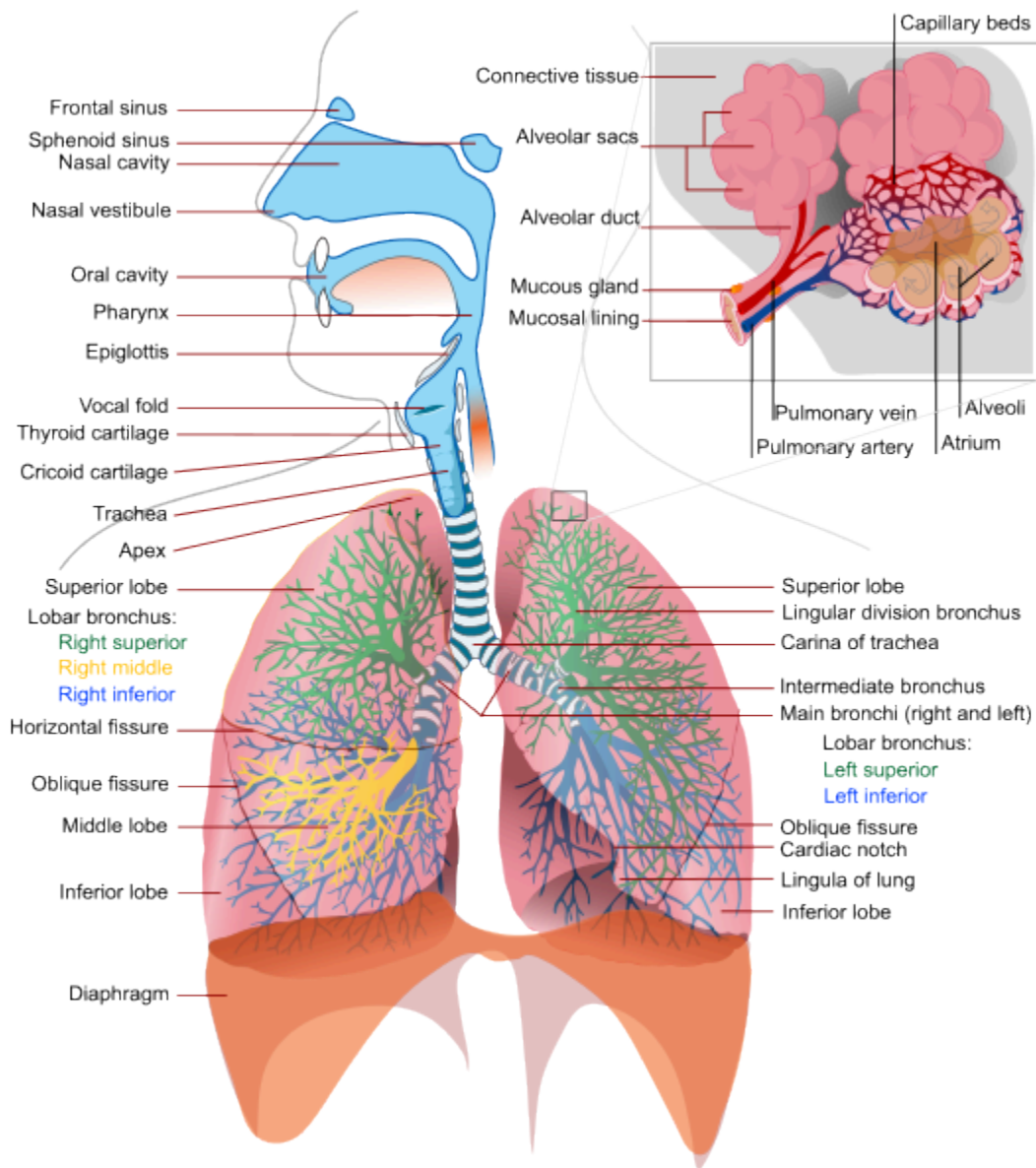


Figure 2.2 Respiratory system

A focused respiratory system assessment includes collecting subjective data about the patient's history of smoking, collecting the patient's and patient's family's history of pulmonary disease, and asking the

patient about any signs and symptoms of pulmonary disease, such as cough and shortness of breath. Objective data is also assessed.

The focused respiratory system assessment in Checklist 19 outlines the process for gathering objective data.

**Checklist 19: Focused Respiratory System Assessment**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [contact precautions](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Explain process to patient.
- Be organized and systematic in your assessment.
- Use appropriate listening and questioning skills.
- Listen and attend to patient cues.
- Ensure patient's privacy and dignity.
- Assess [ABCSS/suction/oxygen/safety](#).
- Apply principles of [asepsis and safety](#).
- Check [vital signs](#).
- Complete necessary [focused assessments](#).

| STEPS   | ADDITIONAL INFORMATION  |
|---|---|
| 1. Conduct a focused interview related to history of respiratory disease, smoking, and environmental exposures. | Ask relevant questions related to dyspnea, cough/sputum, fever, chills, chest pain with breathing, previous history, treatment, medications, etc. |

2. Inspect:

- For use of accessory muscles and work of breathing
- Configuration and symmetry of the chest
- Respirations for rate (1 minute), depth, rhythm pattern
- Skin colour of lips, face, hands, feet
- O<sub>2</sub> saturation with a pulse oximeter

Patients in respiratory distress may have an anxious expression, pursed lips, and/or nasal flaring.

Asymmetrical chest expansion may indicate conditions such as pneumothorax, rib fracture, severe pneumonia, or atelectasis.



*Assess respiration rate*

With hypoxemia, cyanosis of the extremities or around the mouth may be noted.

3. Auscultate (anterior and posterior) lungs for breath sounds and adventitious sounds.

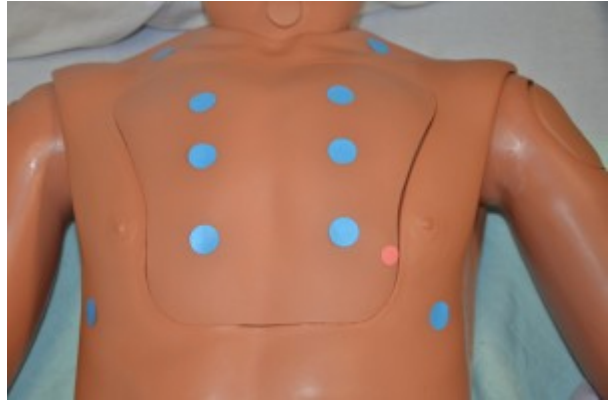
Fine crackles (rales) may indicate asthma and chronic obstructive pulmonary disease (COPD).

Coarse crackles may indicate pulmonary edema.

Wheezing may indicate asthma, bronchitis, or emphysema.

Low-pitched wheezing (rhonchi) may indicate pneumonia.

Pleural friction rub (creaking) may indicate pleurisy.



*Auscultate anterior chest; blue dots indicate stethoscope placement for auscultation*



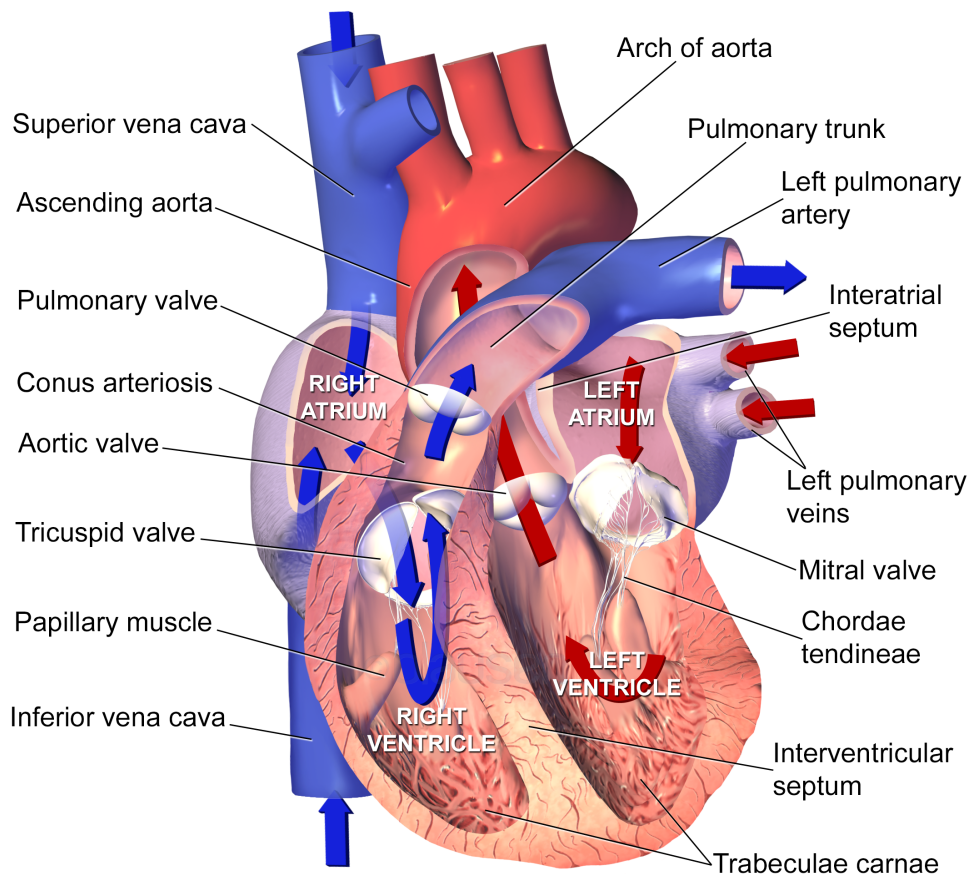
*Auscultate posterior chest; blue dots indicate stethoscope placement for auscultation*

4. Report and document assessment findings and related health problems according to agency policy.

Accurate and timely documentation and reporting promote patient safety.

Data source: Assessment Skill Checklists, 2014; Jarvis et al., 2014; Perry et al., 2014; Stephen et al., 2012; Wilson & Giddens, 2013

## FOCUSED CARDIOVASCULAR AND PERIPHERAL VASCULAR SYSTEM ASSESSMENT



### Sectional Anatomy of the Heart

*Figure 2.3 Anatomy of the heart*

The cardiovascular and peripheral vascular system affects the entire body. A cardiovascular and peripheral vascular system assessment includes collecting subjective data about the patient's diet, nutrition, exercise, and stress levels; collecting the patient's and the patient's family's history of cardiovascular disease; and asking the patient about any signs and symptoms of cardiovascular and peripheral vascular disease, such as peripheral edema, shortness of breath (dyspnea), and irregular pulse rate. Objective data is also assessed.

The focused cardiovascular and peripheral vascular system assessment in Checklist 20 outlines the process for gathering objective data.

**Checklist 20: Focused Cardiovascular/Peripheral Vascular System Assessment**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [contact precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Explain process to patient.
- Be organized and systematic in your assessment.
- Use appropriate listening and questioning skills.
- Listen and attend to patient cues.
- Ensure patient's privacy and dignity.
- Assess [ABCSS/suction/oxygen/safety.](#)
- Apply principles of [asepsis and safety.](#)
- Check [vital signs.](#)
- Complete necessary [focused assessments.](#)

| STEPS   | ADDITIONAL INFORMATION  |
|---|---|
| 1. Conduct a focused interview related to cardiovascular and peripheral vascular disease. | Ask relevant questions related to chest pain/shortness of breath (dyspnea), edema, cough, fatigue, cardiac risk factors, leg pain, skin changes, swelling in limbs, history of past illnesses, history of diabetes, injury. |

2. Inspect:

- Face, lips, and ears for cyanosis
- Chest for deformities, scars
- Bilateral arms/hands, noting CWMS, edema, colour of nail beds, and capillary refill
- Bilateral legs, noting CWMS, edema to lower legs and feet, presence of superficial distended veins, colour of nail beds, and capillary refill
- calf size/pain for signs of DVT

Cyanosis is an indication of decreased perfusion and oxygenation.



*Assess capillary refill*



*Assess bilateral lower legs*

Alterations and bilateral inconsistencies in colour, warmth, movement, and sensation (CWMS) may indicate underlying conditions or injury.

Sudden onset of intense, sharp muscle pain that increases with dorsiflexion of foot is an indication of **deep venous thrombosis (DVT)**, as is increased warmth, redness, tenderness, and swelling in the calf.

**Note:** DVT requires emergency referral because of the risk of developing a pulmonary embolism.

3. Auscultate apical pulse for one minute. Note the rate and rhythm.

Note the heart rate and rhythm. Identify S1 and S2 and follow up on any unusual findings.



*Auscultate apical pulse at the fifth intercostal space and midclavicular line*

4. Palpate the radial, brachial, dorsalis pedis, and posterior tibialis pulses.

Absence of pulse may indicate vessel constriction, possibly due to surgical procedures, injury, or obstruction.



*Assess tibial pulses*



*Assess pedal pulses*

5. Report and document assessment findings and related health problems according to agency policy.

Accurate and timely documentation and reporting promote patient safety.

Data source: Assessment Skill Checklists, 2014; Jarvis et al., 2014; Perry et al., 2014; Stephen et al., 2012; Wilson & Giddens, 2013

## FOCUSED GASTROINTESTINAL AND GENITOURINARY ASSESSMENT

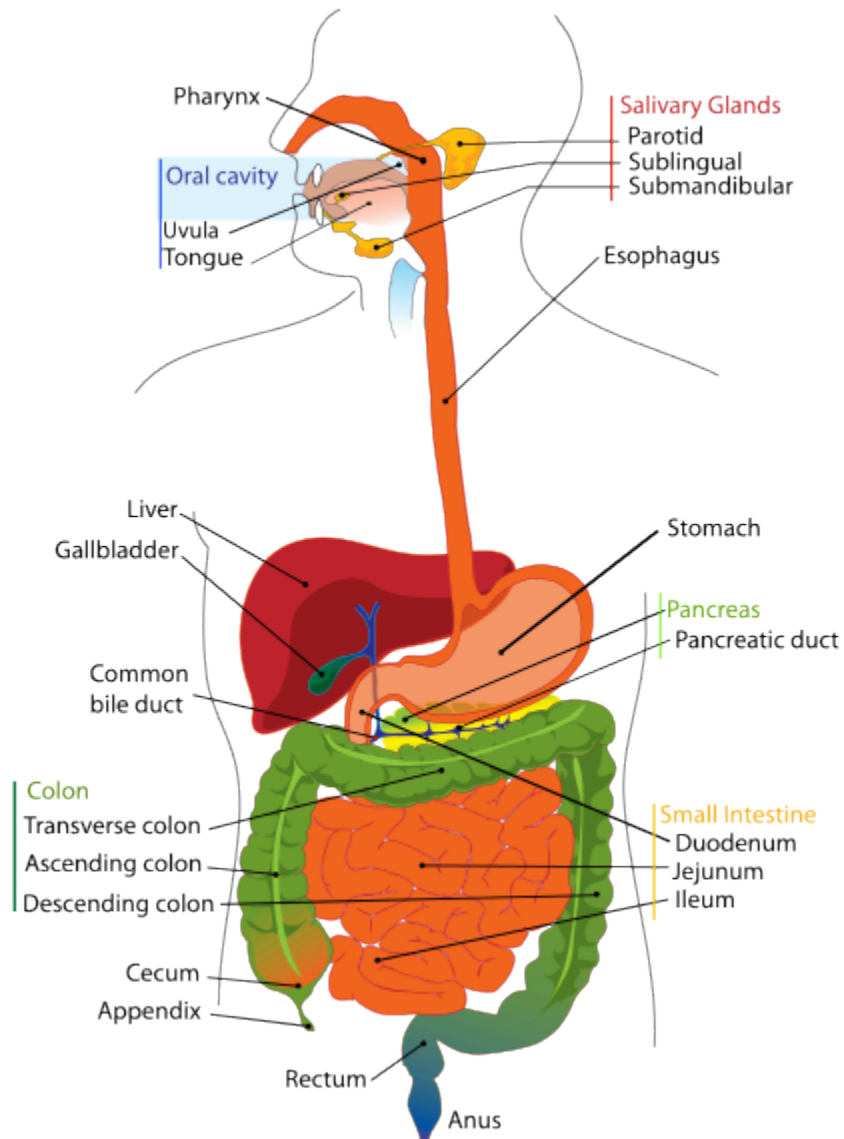
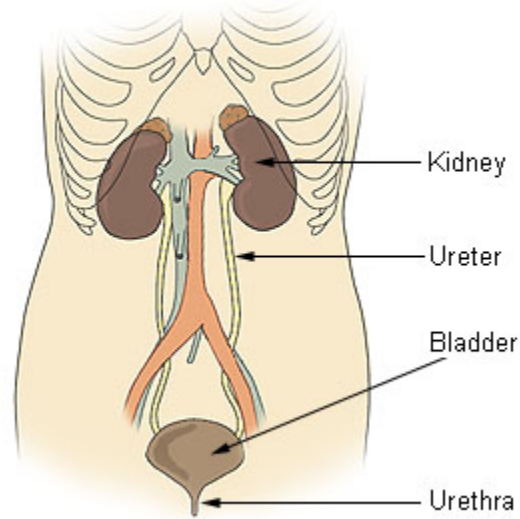


Figure 2.4 Gastrointestinal system

### Components of the Urinary System



*Figure 2.5 Components of the urinary system*

The gastrointestinal and genitourinary system is responsible for the ingestion of food, the absorption of nutrients, and the elimination of waste products. A focused gastrointestinal and genitourinary assessment includes collecting subjective data about the patient's diet and exercise levels, collecting the patient's and the patient's family's history of gastrointestinal and genitourinary disease, and asking the patient about any signs and symptoms of gastrointestinal and genitourinary disease, such as abdominal pain, nausea, vomiting, bloating, constipation, diarrhea, and characteristics of urine and faeces. Objective data is also assessed.

The focused gastrointestinal and genitourinary assessment in Checklist 21 outlines the process for gathering objective data.

**Checklist 21: Focused Gastrointestinal and Genitourinary Assessment**



*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

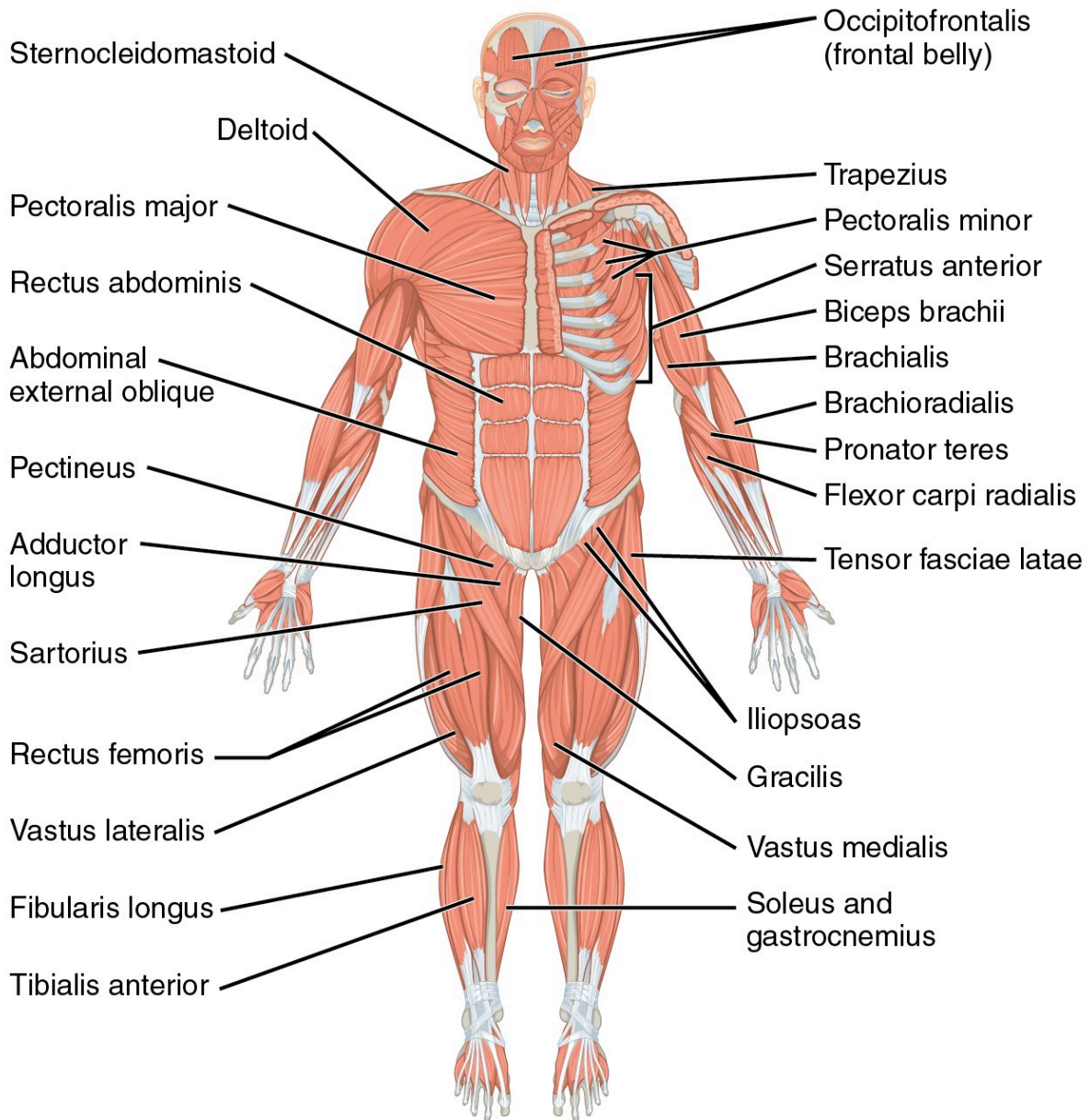
- [Perform hand hygiene.](#)
- Check room for [contact precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Explain process to patient.
- Be organized and systematic in your assessment.
- Use appropriate listening and questioning skills.
- Listen and attend to patient cues.
- Ensure patient’s privacy and dignity.
- Assess [ABCSS/suction/oxygen/safety.](#)
- Apply principles of [asepsis and safety.](#)
- Check [vital signs.](#)
- Complete necessary [focused assessments.](#)

**POSITION PATIENT SUPINE IF TOLERATED**

| STEPS   | ADDITIONAL INFORMATION   |
|---|--|
| 1. Conduct a focused interview related to gastrointestinal and genitourinary systems.   | Ask relevant questions related to the abdomen, urine output, last bowel movement, flatus, any changes, diet, nausea, vomiting, diarrhea.   |
| 2. Inspect: <ul style="list-style-type: none"> <li>• Abdomen for distension, striae, scars, contour, and symmetry</li> <li>• Observe any abdominal movements associated with respiration, or any pulsations or peristaltic waves</li> </ul> | Abdominal distension may indicate ascites associated with conditions such as heart failure, cirrhosis, and pancreatitis. Markedly visible peristalsis with abdominal distension may indicate intestinal obstruction. |

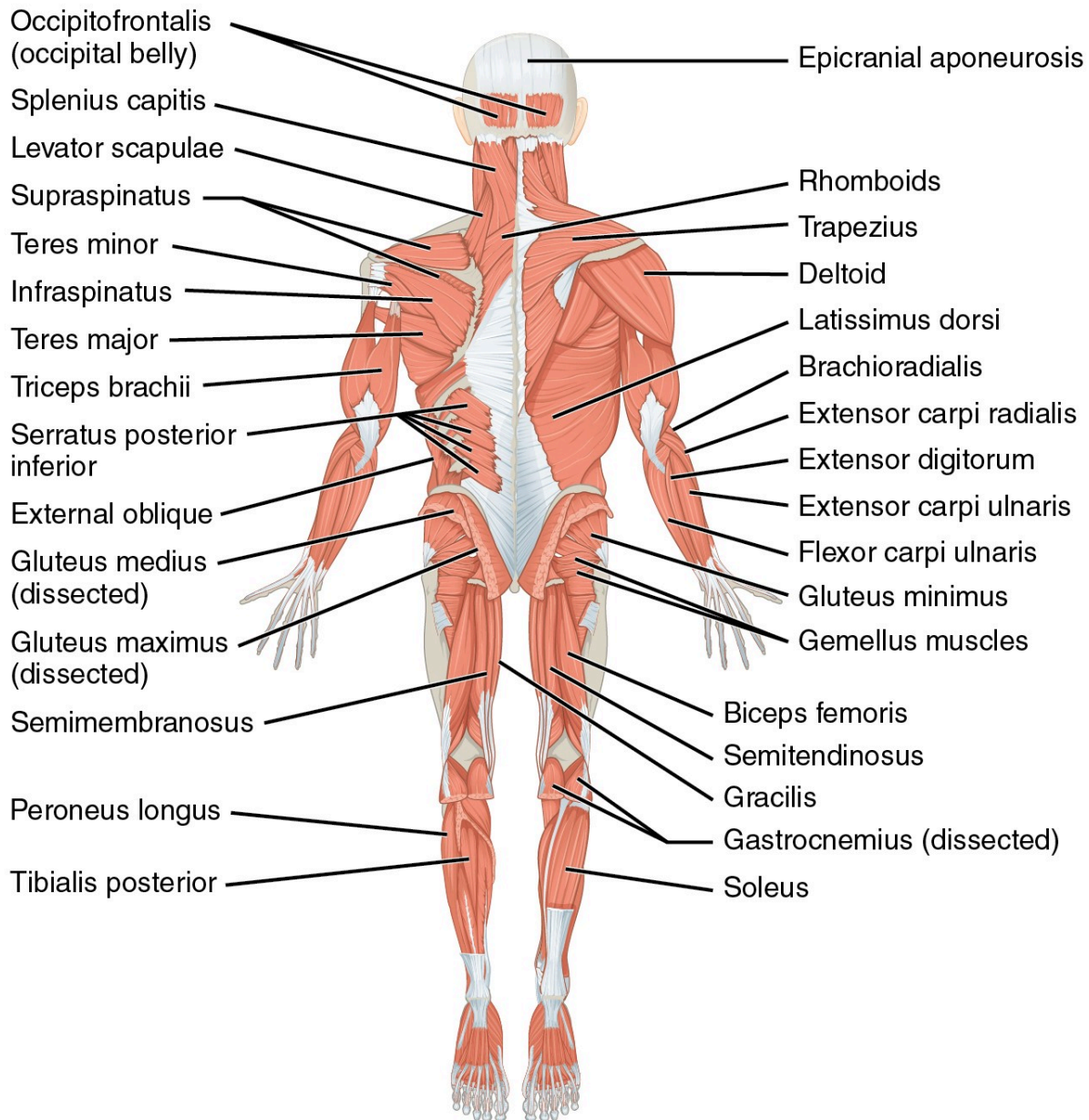
|   |  |
|---|--|
| <p>3. Auscultate abdomen for bowel sounds in all four quadrants before palpation.</p>   | <p>Hyperactive bowel sounds may indicate bowel obstruction, gastroenteritis, or subsiding paralytic ileus.</p> <p>Hypoactive or absent bowel sounds may be present after abdominal surgery, or with peritonitis or paralytic ileus.</p>  <p><i>Auscultate abdomen for bowel sounds in all four quadrants</i></p> |
| <p>4. Palpate abdomen <i>lightly</i> in all four quadrants.</p>   | <p>Palpate to detect presence of masses and distension of bowel and bladder.</p>  <p><i>Palpate abdomen lightly in all four quadrants</i></p> <p>Pain and tenderness may indicate underlying inflammatory conditions such as peritonitis.</p>   |
| <p><b>Note:</b> If patient is wearing a brief, ensure it is clean and dry. Inspect skin underneath for signs of redness/rash/breakdown.</p>                   |  |
| <p><b>Note:</b> If patient has a Foley catheter, inspect bag for urine amount, colour, and clarity. Inspect skin at insertion site for redness/breakdown.</p> |  |
| <p>5. Report and document assessment findings and related health problems according to agency policy.</p>   | <p>Accurate and timely documentation and reporting promote patient safety.</p>   |
| <p>Data source: Assessment Skill Checklists, 2014; Jarvis et al., 2014; Perry et al., 2014; Stephen et al., 2012; Wilson &amp; Giddens, 2013</p>              |  |

## FOCUSED MUSCULOSKELETAL SYSTEM ASSESSMENT



Major muscles of the body.  
Right side: superficial; left side:  
deep (anterior view)

Figure 2.6a Anterior view of muscles



Major muscles of the body.  
Right side: superficial; left side:  
deep (posterior view)

*Figure 2.6b Posterior view of muscles*

A focused musculoskeletal assessment includes collecting subjective data about the patient's mobility and exercise level, collecting the patient's and the patient's family's history of musculoskeletal conditions, and asking the patient about any signs and symptoms of musculoskeletal injury or conditions. Objective data is also assessed.

The focused musculoskeletal assessment in Checklist 22 outlines the process for gathering objective data.

**Checklist 22: Focused Musculoskeletal System Assessment**


*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [contact precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Explain process to patient.
- Be organized and systematic in your assessment.
- Use appropriate listening and questioning skills.
- Listen and attend to patient cues.
- Ensure patient’s privacy and dignity.
- Assess [ABCSS/suction/oxygen/safety.](#)
- Apply principles of [asepsis and safety.](#)
- Check [vital signs.](#)
- Complete necessary [focused assessments.](#)

STEPS

ADDITIONAL INFORMATION

|  |   |
|--|---|
| <p>1. Check patient information prior to assessment:</p> <ul style="list-style-type: none"> <li>• Activity order</li> <li>• Mobility status</li> <li>• Falls risk</li> <li>• Need for assistive devices</li> </ul> | <p>Determine patient's activity as tolerated (AAT)/bed rest requirements.</p>  <p><i>Patient position prior to standing</i></p> <p>Determine if patient has non-weight-bearing, partial, or full weight-bearing status.</p> <p>Determine if patient ambulates independently, with one-person assist (PA), two-person assist (2PA), standby, or lift transfer.</p> <p>Check alertness, medications, pain.</p> <p>Ask if patient uses walker/cane/wheelchair/crutches.</p> <p>Consider non-slip socks/hip protectors/bed-chair alarm.</p> |
| <p>2. Conduct a focused interview related to mobility and musculoskeletal system.</p>  | <p>Ask relevant questions related to the musculoskeletal system, including pain, function, mobility, and activity level (e.g., arthritis, joint problems, medications, etc.).</p>   |

3. Inspect, palpate, and test muscle strength and range of motion:

- Bilateral handgrip strength
- Range of motion (ROM) of knees
- Dorsi/plantar flexion

Evaluate client's ability to sit up before standing, and to stand before walking, and then assess walking ability.

Note strength of handgrip and foot strength for equality bilaterally.



*Assess strength on plantarflexion*



*Assess strength on dorsiflexion*



*Assess grip strength*

Note patient's gait, balance, and presence of pain.

4. Report and document assessment findings and related health problems according to agency policy.

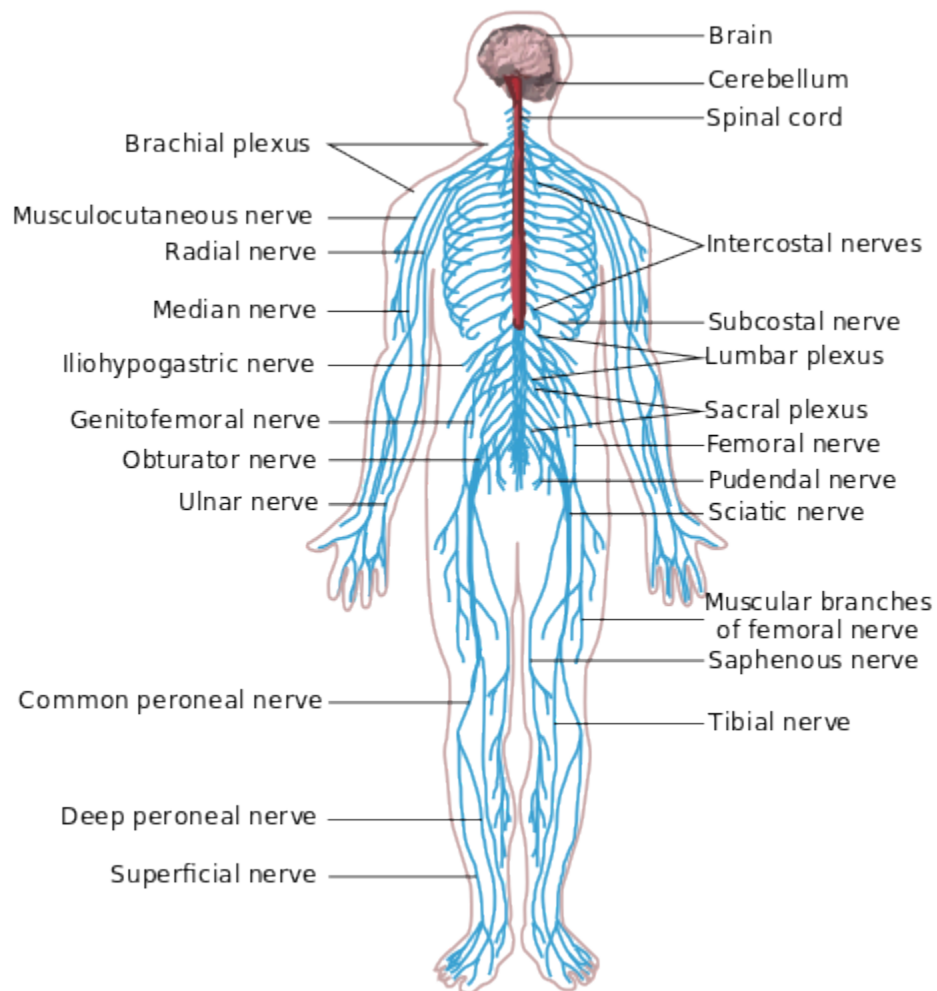
Accurate and timely documentation and reporting promote patient safety.

Data source: Assessment Skill Checklists, 2014; Jarvis et al., 2014; Perry et al., 2014; Stephen et al., 2012; Wilson & Giddens, 2013

## VIDEO 2.1

Watch the video [Assessing Range of Motion and Strength](#) by [Renée Anderson & Wendy McKenzie](#), Thompson Rivers University.

## FOCUSED NEUROLOGICAL SYSTEM ASSESSMENT



*Figure 2.7 Nervous system*

The neurological system is responsible for all human function. It exerts unconscious control over basic body functions, and it also enables complex interactions with others and the environment (Stephen et al., 2012). A focused neurological assessment includes collecting subjective data about the patient's history of head injury or dysfunction, collecting the patient's and the patient's family's history of neurological disease, and asking the patient about signs and symptoms of neurological conditions, such as seizures, memory loss (amnesia), and visual disturbances. Objective data is also assessed.

The focused neurological assessment in Checklist 23 outlines the process for gathering objective data.

### Checklist 23: Focused Neurological System Assessment

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [contact precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Explain process to patient.
- Be organized and systematic in your assessment.
- Use appropriate listening and questioning skills.
- Listen and attend to patient cues.
- Ensure patient's privacy and dignity.
- Assess [ABCSS/suction/oxygen/safety.](#)
- Apply principles of [asepsis and safety.](#)
- Check [vital signs.](#)
- Complete necessary [focused assessments.](#)

#### STEPS

#### ADDITIONAL INFORMATION

1. Conduct a focused interview related to the neurological system.

Ask relevant questions related to past or recent history of head injury, neurological illness, or symptoms, confusion, headache, vertigo, seizures, recent injury or fall, weakness, numbness, tingling, difficulty swallowing (dysphagia) or speaking (dysphasia), and lack of coordination of body movements.




*Focused interview*

|  |   |
|--|---|
| <p>2. Assess mental health status.</p> | <p>Assess mental status by observing the patient's appearance, attitude, activity (behaviour), mood and affect, and asking questions similar to those outlined in this example of a <a href="#">mini-mental state examination (MMSE)</a>.</p> |
|--|---|

3. Assess neurological function using the Glasgow Coma Scale (GCS):

- Assess best eye-opening response.
- Assess best motor response.
- Assess best verbal response.

|  |   |   |
|--|---|---|
| <p><b>Best eye-opening response</b><br/>Record “C” if eyes closed due to swelling.</p>                                   | Spontaneously                             | 4 |
|  | To speech                                 | 3 |
|  | To pain                                   | 2 |
|  | No response                               | 1 |
| <p><b>Best motor response (to painful stimuli)</b><br/>Press at fingernail bed and record best upper-limb response.</p>  | Obeys verbal command                      | 6 |
|  | Localizes pain                            | 5 |
|  | Flexion – withdrawal                      | 4 |
|  | Flexion – abnormal                        | 3 |
|  | Extension – abnormal                      | 2 |
|  | No response                               | 1 |
| <p><b>Best verbal response</b><br/>Record “E” if endotracheal tube is in place, and “T” if tracheostomy is in place.</p> | Oriented x 3 (to person, time, and place) | 5 |
|  | Conversation – confused                   | 4 |
|  | Speech – inappropriate                    | 3 |
|  | Sounds – incomprehensible                 | 2 |
|  | No response                               | 1 |

|   |   |
|---|---|
|   | <p>Glasgow Coma Scale adapted from Jarvis et al., 2014, p. 699.</p>   |
| <p>4. Note patient's LOC (level of consciousness, oriented x 3), general appearance, and behaviour.</p> | <p>Note hygiene, grooming, speech patterns, facial expressions.</p>   |
| <p>5. Assess pupils for size, equality, reaction to light (PERL), and consensual reaction to light.</p> | <p>Unequal pupils may indicate underlying neurological disease or injury.</p>  <p><i>Assess pupillary reaction to light</i></p> |

## 6. Assess motor strength and sensation.

- Arms and legs for strength (compare bilaterally)
- Handgrips, drift
- Extremities for sensation, numbness, tingling

Unequal motor strength and unusual sensation may indicate underlying neurological disease or injury, such as stroke or head injury.



*Assess motor strength and sensation of extremities*



*Assess motor strength and sensation of extremities*



*Assess motor strength and sensation of extremities*

## 7. Report and document assessment findings and related health problems according to agency policy.

Accurate and timely documentation and reporting promote patient safety.

Data source: Assessment Skill Checklists, 2014; Jarvis et al., 2014; Perry et al., 2014; Stephen et al., 2012; Wilson & Giddens, 2013

VIDEO 2.2

Watch the video [Neurological Assessment \(Basic\)](#) by [Renée Anderson & Wendy McKenzie](#), Thompson Rivers University.

Critical Thinking Exercises

1. Your patient complains of stomach pain during your head-to-toe assessment. What would be your next steps?
2. You notice that your patient seems lethargic during your head-to-toe assessment. What would be your next steps?

**ATTRIBUTIONS**

**Figure 2.2**

[The respiratory system](#) by [LadyofHats](#) is in the [public domain](#).

**Figure 2.3**

[Sectional anatomy of the heart](#) by [Blausen Medical Communications, Inc.](#) is used under a [CC BY 3.0](#) licence.

**Figure 2.4**

[Digestive system diagram](#) by Mariana Ruiz Villarreal is in the [public domain](#).

**Figure 2.5**

[Urinary system](#) is in the [public domain](#).

**Figure 2.6**

[Anterior and posterior views of muscles](#) by OpenStax College is used under a [CC BY 3.0](#) licence.

**Figure 2.7**

[Nervous system diagram](#) by William Crochot is used under a [CC BY SA 4.0](#) licence.

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## 2.8 Summary

This chapter has outlined the different components of health assessment. Different assessments are done in different contexts and are dependent on the type of patient, health care professional, and environment.

The health assessment is an opportunity to develop a therapeutic relationship with the patient, optimize communication, promote health, and provide patient education as necessary. Throughout the assessment, be aware of ensuring patient safety, privacy, and dignity.

The assessment must always be documented according to the agency policy, and any unusual findings must be reported comprehensively, in conjunction with other pertinent findings, to appropriate members of the health care team.

### Key Takeaways

- Health assessment refers to a systematic method of collecting and analyzing data for the purpose of planning patient-centred care.
- A pain assessment should be measured at the beginning of the physical assessment, and comfort measures taken as necessary.
- Safety considerations should be followed throughout any physical assessment.
- Components of health assessment include conducting a health history, performing a physical examination, and communicating and documenting the findings according to agency policy.
- The amount of information gained during a health assessment depends on several factors, including the context of care, patient needs, and the health care professional.
- The types of health assessments are head-to-toe, focused, initial, and emergency assessment.
- The data collected during the health assessment is organized and interpreted to initiate or continue a plan of care.

### SUGGESTED ONLINE RESOURCES

1. [Auscultation Assistant, The](#). This website provides audio clips of heart murmurs and lung sounds.
2. [BC Patient Safety & Quality Council: 48/6 Model of care](#). This resource offers a model of care for hospitalized seniors (aged 70 and older) in British Columbia. It is an integrated care initiative that addresses six care areas of functioning through patient screening and assessment (assessments are completed only where screening shows areas of concern) within the first 48 hours of hospital admission.

3. [Canadian Patient Safety Institute \(CPSI\): The Canadian framework for teamwork and communication](#). This framework provides health care providers with techniques to improve teamwork and collaboration.
4. [Canadian Patient Safety Institute \(CPSI\): The safety competencies](#). Developed by the Safety Competencies Steering Committee of CPSI, this interprofessional patient safety framework identifies the knowledge, skills, and attitudes required by all health care professionals to practise safely.

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## Chapter 3. Safe Patient Handling, Positioning, and Transfers



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## 3.1 Introduction

In health care, all patient-handling activities, such as positioning, transfers, and ambulation, are considered high risk for injury to patients and health care providers. This chapter reviews the essential guidelines for proper body mechanics and safe transfer techniques to minimize and eliminate injury in health care.

### Learning Objectives

- Describe body mechanics and principles of body mechanics
- Define musculoskeletal injury (MSI), factors that contribute to an MSI, and ways to prevent an MSI
- Describe how to complete a mobility assessment prior to positioning, transferring, or ambulating a patient
- Describe various techniques for positioning a patient in bed and types of positions
- Describe how to transfer a patient using assistive devices
- Describe how to transfer a patient from a stretcher to a bed and from a wheelchair to a bed
- Discuss how to prevent accidental falls in the acute and community setting



---

## 3.2 Body Mechanics

**Body mechanics** involves the coordinated effort of muscles, bones, and the nervous system to maintain balance, posture, and alignment during moving, transferring, and positioning patients. Proper body mechanics allows individuals to carry out activities without excessive use of energy, and helps prevent injuries for patients and health care providers (Perry, Potter, & Ostendorf, 2014).

### MUSCULOSKELETAL INJURIES

A **musculoskeletal injury (MSI)** is an injury or disorder of the muscles, tendons, ligaments, joints or nerves, blood vessels, or related soft tissue including a sprain, strain, or inflammation related to a work injury. MSIs are the most common health hazard for health care providers (WorkSafeBC, 2013). Table 3.1 lists risk factors that contribute to an MSI.

**Table 3.1 Factors That Contribute to an MSI**

| <b>Factor</b>   | <b>Special Information</b>   |
|---|--|
| Ergonomic risk factors  | Repetitive or sustained awkward postures, repetition, or forceful exertion   |
| Individual risk factors   | Poor work practice; poor overall health (smoking, drinking alcohol, and obesity); poor rest and recovery; poor fitness, hydration, and nutrition |
| Data source: Perry et al., 2014; Workers Compensation Board, 2001; WorkSafeBC, 2013 |  |

When health care providers are exposed to ergonomic risk factors, they become fatigued and risk musculoskeletal imbalance. Additional exposure related to individual risk factors puts health care providers at increased risk for an MSI (WorkSafeBC, 2013). Preventing an MSI is achieved by understanding the elements of body mechanics, applying the principles of body mechanics to all work-related activities, understanding how to assess a patient's ability to position or transfer, and learning safe handling transfers and positioning techniques.

### ELEMENTS OF BODY MECHANICS

Body movement requires coordinated muscle activity and neurological integration. It involves the basic elements of body alignment (posture), balance, and coordinated movement. Body alignment and posture bring body parts into position to promote optimal balance and body function. When the body is well aligned, whether standing, sitting, or lying, the strain on the joints, muscles, tendons, and ligaments is minimized (WorkSafeBC, 2013).

**Body alignment** is achieved by placing one body part in line with another body part in a vertical or horizontal line. Correct alignment contributes to body balance and decreases strain on muscle-skeletal

structures. Without this balance, the risk of falls and injuries increase. In the language of body mechanics, the **centre of gravity** is the centre of the weight of an object or person. A lower centre of gravity increases stability. This can be achieved by bending the knees and bringing the centre of gravity closer to the base of support, keeping the back straight. A wide base of support is the foundation for stability. A wide **base of support** is achieved by placing feet a comfortable, shoulder width distance apart. When a vertical line falls from the centre of gravity through the wide base of support, **body balance** is achieved. If the vertical line moves outside the base of support, the body will lose balance.

The diagram in Figure 3.1 demonstrates (A) a well-aligned person whose balance is maintained and whose **line of gravity** falls within the base of support. Diagram (B) demonstrates how balance is not maintained when the line of gravity falls outside the base of support, and diagram (C) shows how balance is regained when the line of gravity falls within the base of support.

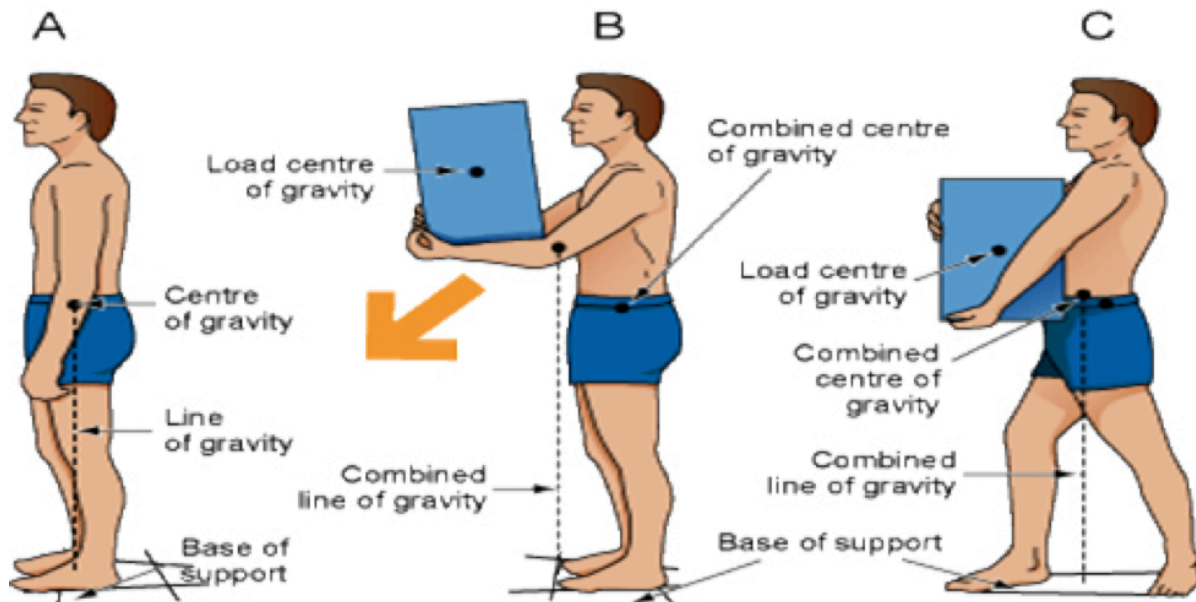


Figure 3.1 Centre of gravity

## PRINCIPLES OF BODY MECHANICS

Table 3.2 describes the principles of body mechanics that should be applied during all patient-handling activities.

**Table 3.2 Principles of Body Mechanics**




| <b>Action</b>                          | <b>Principle</b>   |
|--|--|
| Assess the environment.                | Assess the weight of the load before lifting and determine if assistance is required.  |
| Plan the move.                         | Plan the move; gather all supplies and clear the area of obstacles.  |
| Avoid stretching and twisting.         | Avoid stretching, reaching, and twisting, which may place the line of gravity outside the base of support.   |
| Ensure proper body stance.             | <p>Keep stance (feet) shoulder-width apart.</p> <p>Tighten abdominal, gluteal, and leg muscles in anticipation of the move.</p> <p>Stand up straight to protect the back and provide balance.</p>  |
| Stand close to the object being moved. | <p>Place the weight of the object being moved close to your centre of gravity for balance.</p> <p>Equilibrium is maintained as long as the line of gravity passes through its base of support.</p> <div> <p>The image shows a person from the side, wearing a dark blue uniform with pink trim on the sleeves. They are holding a cardboard box with both hands, positioned close to their chest. The box has some text on it, including 'JB-13-01P', 'Chambre de Sodium à 0.9% USP, injectable', and 'LOT: W0000000 EXP: 2018 04'. The person's feet are shoulder-width apart, and they appear to be standing straight.</p> </div> <p><i>Hold objects close to your centre of gravity</i></p> |
| Face direction of the movement.        | Facing the direction prevents abnormal twisting of the spine.  |


|  |   |
|--|---|
| Avoid lifting.   | Turning, rolling, pivoting, and leverage requires less work than lifting.<br>Do not lift if possible; use mechanical lifts as required.<br>Encourage the patient to help as much as possible. |
| Work at waist level.   | Keep all work at waist level to avoid stooping.<br>Raise the height of the bed or object if possible.<br>Do not bend at the waist.  |
| Reduce friction between surfaces.  | Reduce friction between surfaces so that less force is required to move the patient.  |
| Bend the knees.  | Bending the knees maintains your centre of gravity and lets the strong muscles of your legs do the lifting.   |
| Push the object rather than pull it, and maintain continuous movement.   | It is easier to push an object than to pull it.<br>Less energy is required to keep an object moving than it is to stop and start it.  |
| Use assistive devices.   | Use assistive devices (gait belt, slider boards, mechanical lifts) as required to position patients and transfer them from one surface to another.  |
| Work with others.  | The person with the heaviest load should coordinate all the effort of the others involved in the handling technique.  |
| Data source: Berman & Snyder, 2016; Perry et al., 2014; WorkSafeBC, 2013 |   |

## ASSISTIVE DEVICES

An **assistive device** is an object or piece of equipment designed to help a patient with activities of daily living, such as a walker, cane, gait belt, or mechanical lift (WorkSafeBC, 2006). Table 3.3 lists some assistive devices found in the hospital and community setting.

Table 3.3 Assistive Devices

| Type                           | Definition  |
|--------------------------------|---|
| Gait belt or transfer belt     | <p>Used to ensure a good grip on unstable patients. The device provides more stability when transferring patients. It is a 2-inch-wide (5 mm) belt, with or without handles, that is placed around a patient's waist and fastened with Velcro. The gait belt must always be applied on top of clothing or gown to protect the patient's skin. A gait belt can be used with patients in both one-person or two-person pivot transfer, or in transfer with a slider board.</p>  <p><i>Gait belt</i></p> |
| Slider board or transfer board |  <p><i>Slider board (red) on a stretcher</i></p>  <p><i>Placing a slider board (transfer board) under a patient</i></p> <p>A slider board is used to transfer immobile patients from one surface to another while the patient is lying supine. The board allows health care providers to safely move immobile, bariatric, or complex patients.</p>   |

|   |   |
|---|---|
| Mechanical lift                                   | <p>A mechanical lift is a hydraulic lift, usually attached to a ceiling, used to move patients who cannot bear weight, who are unpredictable or unreliable, or who have a medical condition that does not allow them to stand or assist with moving.</p>  <p><i>Mechanical lift</i></p> |
| Data source: Perry et al., 2014; WorkSafeBC, 2006 |   |

VIDEO 3.1

Watch the video [How to use a Ceiling Lift](#) by [Renée Anderson & Wendy McKenzie](#), Thompson Rivers University.

*Special considerations:*

- Use assistive devices only if properly trained in their safe use.
- Always tell patients what you are about to do and how they should assist you in the procedure.
- Always perform a patient risk assessment or mobility assessment prior to using any assistive devices. The following link provides additional information regarding assistive devices from [WorkSafeBC](#).
- Use proper body mechanics when using assistive devices.

Critical Thinking Exercises

1. How do body alignment and body balance contribute to proper body mechanics?
2. John is asked to lift a heavy box from a table onto a trolley. Name five principles of body mechanics John can implement to prevent an MSI.

---

## 3.3 Patient Risk Assessment

To prevent and minimize MSI injuries related to patient handling activities, a risk assessment must be done to determine a patient's ability to move, the need for assistance, and the most appropriate means of assistance (Provincial Health Services Authority [PHSA], 2010). There are four important areas to assess:

- The patient
- The environment
- The health care provider
- The organization of the work

Checklist 24 outlines what to assess and how to assess a patient prior to positioning, ambulation, and transfers.

**Checklist 24: Risk Assessment**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- The assessment process should not override clinical judgment and patient-specific needs as determined by the health care team.
- An assessment should be performed before each handling procedure.
- Seek additional help if a procedure requires two or more persons.
- Use assistive devices (gait belts, slider boards, pillows, etc.) to perform the procedure safely.
- Assess the patient’s ability to tolerate the movement. Acute pain, shortness of breath, and inability to follow direction will place the health care provider and patient at risk for an injury.
- Always consider the principles of proper body mechanics prior to any procedure, such as raising the head of bed and tucking elbows in to help prevent injuries.
- Avoid lifting shoulders when positioning a patient.
- Never lift a patient; always use a weight shift to perform the procedure.
- When positioning a patient using a sheet, place palms of hands up. A palms-down technique increases risk for injury.
- Vision and hearing loss and language barriers may increase risk for injury.

STEPS

ADDITIONAL CONSIDERATIONS

## 1. Assess your patient.

There are three areas to assess:

## 1. Is the patient cooperative and able to follow directions?

Ask patient to squeeze your hands. Is the behaviour predictable (non-aggressive, fearful, or fatigued)? Is the patient able to follow directions with cues?

If yes, proceed to next question.

If no, use a mechanical lift for transfers and/or assistive devices for repositioning in bed if patient has some abilities.

## 2. Can the patient bear weight?

Ask patient to lift buttocks off the bed (also known as “bridging”) and hold the position for 5 seconds. The health care provider may give cues on how to lift buttocks off the bed.



*Bridging hips strength test*

After bridging, ask the patient to perform a straight leg raise by lifting one leg up off the bed and holding it for 5 seconds while the other leg is kept bent. Repeat with the opposite leg.



*Leg lift strength test*

If yes, proceed to next question.

If no, use an appropriate moving technique, such as a mechanical lift and/or assistive device, to transfer a non-weight-bearing patient.

## 3. Can the patient sit up on the side of the bed without support? Can the patient sit forward on a chair or the edge of the bed without support?

|   |  |
|---|--|
|   | <div> </div> <p><i>Sit unassisted on the bed</i></p> <p>If yes, decide on the amount of assist required (minimum, moderate, or maximum) according to your agency policy.</p> <p>If no, use a mechanical lift for transfers and/or an assistive device for repositioning if patient has some movement abilities.</p> |
| <p>2. Assess your environment.</p>  | <p>Is there adequate space?</p> <p>Is available equipment in proper working order?</p> <p>Have all hazards been removed?</p>   |
| <p>3. Assess yourself and readiness to perform procedures.</p>  | <p>Complete all required training according to health agency regulations.</p> <p>Wear non-slip footwear.</p> <p>Maintain a neutral spine; do not twist or side bend, and use proper body mechanics when moving or positioning patients.</p> <p>Designate a leader if working in a team to mobilize or position a patient.</p> <p>Always use proper weight-shift techniques (side to side, front to back, and up and down).</p>                             |
| <p>4. Assess your work organization.</p>  | <p>Ensure adequate number of caregivers.</p> <p>Ensure there is enough time to perform the procedure.</p> <p>Take rest breaks and vary activities to promote optimal back health.</p> <p>If patient is complex or bariatric, consult additional resources, seek assistance, and use assistive devices.</p>   |
| <p>Data source: Interior Health, 2012; National Institute of Occupational Safety and Health, 2010; PHSA, 2010; WorkSafeBC, 2010</p> |  |

To help you assess and make decisions about moving a patient, refer to these two useful tools.

[Read the \*Mobility Decision Support Tool PDF\*](#), which was provincially developed, to guide decision making about transfers and ambulation.

[Watch the \*Assess Every Time video\*](#), which was developed by WorkSafeBC, to review the quick assessment as described in Checklist 24.

#### Critical Thinking Exercises

1. A patient requires repositioning in bed. After your assessment, you determine the patient is cooperative and predictable, able to weight bear, but unable to sit up unassisted. What are your two options to reposition the patient?
2. When assessing your abilities to perform a patient-handling procedure, what five things must you consider?
3. Vision and hearing impairments, along with language barriers, are risk factors when performing patient-handling procedures. What additional risk factors should be considered?



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## 3.4 Immobility and Assisting Patients

When patients are recovering from illness, they may require assistance to move around in bed, to transfer from bed to wheelchair, or to ambulate. Changing patient positions in bed and mobilization are also vital to prevent contractures from immobility, maintain muscle strength, prevent pressure ulcers, and help body systems function properly for optimal health and healing (Perry et al., 2014). The amount of assistance each patient will require depends on the patient's previous health status, age, type of illness, and length of stay (Perry et al., 2014).

### TYPES OF ASSISTANCE

At times, patients are assessed and given a "level of assistance" required for transferring. This is most common in residential care settings. The level of assistance is based on the patient's ability to transfer and stand. The terms describing different levels of assistance are used by health care providers to communicate with each other so everyone understands what type of assistance is required. The assistance needed is usually charted on the patient's Kardex, above the head of the bed, and/or on the patient's chart. Table 3.4 describes different types of assistance in the hospital and community setting.

**Table 3.4 Level of Assistance**

| <b>Level of Assistance</b>            | <b>Description</b>   |
|---------------------------------------|--|
| Independent                           | The patient is able to transfer independently and safely.  |
| Standby supervision                   | The patient requires no physical assistance but may require verbal reminder.<br><br>This type of patient may also be learning to transfer independently using a wheelchair, walker, or cane. |
| Minimal assist                        | The patient is cooperative but needs minimal physical assistance with the transfer.  |
| One-person standing pivot             | The patient can bear weight on one or both legs and is cooperative and predictable.<br><br>The patient also can sit with minimal support on the side of the bed.                             |
| Two-person standing pivot             | The patient can assist with weight bearing, but may be inconsistent.<br><br>The patient is cooperative and predictable.  |
| One-person assist with transfer board | The patient is cooperative, follows directions, and has good trunk control.<br><br>The patient can use their arms, but cannot bear weight on both legs.                                      |

|  |  |
|--|--|
| Two-person assist with transfer board                        | <p>The patient is cooperative and can follow directions.</p> <p>The patient can use their arms, but cannot bear weight on both legs. The patient does not have good trunk control.</p> <p>The patient's wheelchair has removable arms.</p>   |
| Mechanical stand   | <p>The patient may have some ability to stand, but is unreliable.</p> <p>The patient may be unpredictable (due to cognitive changes, medications).</p> <p>The patient is a heavy two-person transfer and requires toileting or pericare.</p> <p>The patient does not have severe limb contractures or injuries where movement is medically contraindicated (e.g., spinal injury).</p> <p><a href="#">Use of a mechanical lift.</a></p> |
| Data source: Winnipeg Regional Health Authority (WRHA), 2008 |  |

*Special considerations:*

- Assess the patient every time before a move as a patient's condition may worsen or improve throughout the hospital stay.
- Results of assessments should be properly documented according to agency policy to ensure safe transfers for all health care providers.
- Any patient-handling injuries must be reported using the **British Columbia Patient Safety and Learning System (BCPSLS)**, a web-based tool used to report and learn about safety events, near misses, and hazards in health care settings (BCPSLS, 2015).

If the patient is cooperative, able to bear weight, and has some balance to sit (see [Checklist 24: Risk Assessment](#)), the health care provider must decide how much assistance the patient needs. Table 3.5 provides guidelines to consider.

**Table 3.5 Assistance Required for Transfer**

| Assess                  | Description   |
|-------------------------|---|
| Minimal                 | One-person transfer with gait belt<br>The patient is able to perform 75% of the required activity on their own.   |
| Moderate                | Two-person transfer with a gait belt, a stander, or a two-person transfer with a slide board and a gait belt<br>The patient is able to perform 50% of the required activity on their own. |
| Maximum                 | Stander or a two-person transfer with a slide board and gait belt<br>The patient is able to perform 25% of the required activity on their own.  |
| Data source: WRHA, 2008 |   |

*Special considerations:*

- The weight, height, and general physical, mental, or emotional condition of the patient all influence the potential for injury.
- If the patient is uncooperative or unable to follow commands, there is an increased risk for injury. It is recommended that a mechanical lift or assistive device be used to prevent injury to the health care provider and patient.
- If there is any question about the patient's ability, always reassess.

## Critical Thinking Exercises

1. A patient requires no assistance from the health care provider except for the occasional reminder to lift feet while walking. Is the patient's level of assistance considered independent or a minimal assist?
2. A patient is assessed as a one-person pivot. As the health care provider begins the transfer, the patient suddenly becomes uncooperative. What should the health care provider do next?

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## 3.5 Positioning Patients in Bed




Positioning a patient in bed is important for maintaining alignment and for preventing bed sores (pressure ulcers), foot drop, and contractures (Perry et al., 2014). Proper positioning is also vital for providing comfort for patients who are bedridden or have decreased mobility related to a medical condition or treatment. When positioning a patient in bed, supportive devices such as pillows, rolls, and blankets, along with repositioning, can aid in providing comfort and safety (Perry et al., 2014).

### **PATIENT POSITIONS IN BED**

Positioning a patient in bed is a common procedure in the hospital. There are various positions possible for patients in bed, which may be determined by their condition, preference, or treatment related to an illness. Table 3.6 lists patient positions in bed.

**Table 3.6 Patient Positions in Bed**

| Position         | Description   |
|------------------|---|
| Supine position  | <p>Patient lies flat on back. Additional supportive devices may be added for comfort.</p>  <p><i>Supine position</i></p>  |
| Prone position   | <p>Patient lies on stomach with head turned to the side.</p>  <p><i>Prone position</i></p>   |
| Lateral position | <p>Patient lies on the side of the body with the top leg over the bottom leg. This position helps relieve pressure on the coccyx.</p>  <p><i>Lateral position</i></p> |

|                        |   |
|------------------------|---|
| Sims position          | <p>Patient lies between supine and prone with legs flexed in front of the patient. Arms should be comfortably placed beside the patient, not underneath.</p>  <p><i>Sims position</i></p>                                     |
| Fowler's position      | <p>Patient's head of bed is placed at a 45-degree angle. Hips may or may not be flexed. This is a common position to provide patient comfort and care.</p>  <p><i>Fowler's position</i></p>                                  |
| Semi-Fowler's position | <p>Patient's head of bed is placed at a 30-degree angle. This position is used for patients who have cardiac or respiratory conditions, and for patients with a nasogastric tube.</p>  <p><i>Semi-Fowler's position</i></p> |

|   |   |
|---|---|
| <p>Orthopneic or tripod position</p>                                    | <p>Patient sits at the side of the bed with head resting on an over-bed table on top of several pillows. This position is used for patients with breathing difficulties.</p>  |
| <p>Trendelenburg position</p>   | <p>Place the head of the bed lower than the feet. This position is used in situations such as hypotension and medical emergencies. It helps promote venous return to major organs such as the head and heart.</p> <div> </div> <p><i>Trendelenburg position</i></p> |
| <p>Data source: ATI, 2015a; Perry et al., 2014; Potter et al., 2011</p> |   |

### MOVING A PATIENT UP IN BED


When moving a patient in bed, perform a patient risk assessment prior to the procedure to determine the level of assistance needed for optimal patient care. If a patient is unable to assist with repositioning in bed, follow agency policy regarding “no patient lifts” and the use of mechanical lifts for complex and bariatric patients. See Checklist 25 for the steps to move a patient up in bed.




**Checklist 25: Moving a Patient Up in Bed**



*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [contact precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Listen and attend to patient cues.
- Ensure patient's privacy and dignity.
- Assess [ABCCS/suction/oxygen/safety.](#)
- Ensure tubes and attachments are properly placed prior to the procedure to prevent accidental removal.
- Ensure patient has a draw sheet or a friction-reducing sheet on the bed prior to repositioning.

| STEPS  | ADDITIONAL INFORMATION   |
|--|--|
| 1. Make sure an additional health care provider is available to help with the move.  | This procedure requires two health care providers.   |
| 2. Explain to the patient what will happen and how the patient can help.   | Doing this provides the patient with an opportunity to ask questions and help with the positioning.  |
| 3. Complete risk assessment ( <a href="#">Checklist 24</a> ) of patient's ability to help with the positioning.              | This step prevents injury to patient and health care provider.   |
| 4. Raise bed to safe working height and ensure that brakes are applied. Health care providers stand on each side of the bed. | <p>Principles of proper body mechanics help prevent MSI.</p> <p>Safe working height is at waist level for the shortest health care provider.</p>  <p><i>Bed at waist level</i></p> |

|  |  |
|--|--|
| <p>5. Lay patient supine; place pillow at the head of the bed and against the headboard.</p>   | <p>This step protects the head from accidentally hitting the headboard during repositioning.</p>   |
| <p>6. Stand between shoulders and hips of patient, feet shoulder width apart. Weight will be shifted from back foot to front foot.</p>                               | <p>This keeps the heaviest part of the patient closest to the centre of gravity of the health care providers.</p>  <p><i>Feet shoulder width apart</i></p> |
| <p>7. Fan-fold the draw sheet toward the patient with palms facing up.</p>   | <p>This provides a strong grip to move the patient up using the draw sheet.</p>  <p><i>Fold sheet with fingers facing upward</i></p>                      |
| <p>8. Ask patient to tilt head toward chest, fold arms across chest, and bend knees to assist with the movement. Let the patient know when the move will happen.</p> | <p>This step prevents injury from patient and prepares patient for the move.</p>  <p><i>Chin tucked in and arms across chest</i></p>                     |
| <p>9. Tighten your gluteal and abdominal muscles, bend your knees, and keep back straight and neutral.</p>   | <p>The principles of proper body mechanics help prevent injury.</p>  |

|  |  |
|--|--|
| <p>10. On the count of three by the lead person, gently slide (not lift) the patient up the bed, shifting your weight from the back foot to the front, keeping back straight with knees slightly bent.</p> | <p>The principles of proper body mechanics help prevent injury.</p>  <p><i>Facing direction of movement</i></p>  |
| <p>11. Replace pillow under head, position patient in bed, and cover with sheets.</p>  | <p>This step promotes comfort and prevents harm to patient.</p>  |
| <p>12. Lower bed, raise side rails as required, and ensure call bell is within reach. <a href="#">Perform hand hygiene.</a></p>  | <p>Placing bed and side rails in safe positions reduces the likelihood of injury to patient. Proper placement of call bell facilitates patient's ability to ask for assistance.</p>  <p><i>Bed in lowest position, side rail up, call bell within reach</i></p> <p>Hand hygiene reduces the spread of microorganisms.</p> |
| <p>Data source: Perry et al., 2014; PHSA, 2010</p>   |  |

Watch these three videos for more information about how to move a patient up in bed.

[Take this \*Repositioning a Patient in Bed, Caregivers at Head\* course](#) to learn how to move a patient up in bed, with caregivers at the head of the bed.

[Take this \*Repositioning a Patient in Bed, Caregivers Facing Each Other\* course](#) to learn how to move a patient up in bed, with the caregivers facing each other.

[Take this \*Repositioning a Patient in Bed, Diagonal Technique\* course](#) to learn how to move a patient up in bed, with the caregivers standing positioned diagonally.

## **POSITIONING A PATIENT TO THE SIDE OF THE BED**


Prior to ambulating, repositioning, or transferring a patient from one surface to another (e.g., a stretcher to a bed), it may be necessary to move the patient to the side of the bed to avoid straining or excessive reaching by the health care provider. Positioning the patient to the side of the bed also allows the health care provider to have the patient as close as possible to the health care provider's centre of gravity for optimal balance during patient handling. Checklist 26 describes how to safely move a patient to the side of the bed.




**Checklist 26: Positioning a Patient to the Side of the Bed**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [contact precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Listen and attend to patient cues.
- Ensure patient's privacy and dignity.
- Assess [ABCCS/suction/oxygen/safety.](#)
- Ensure tubes and attachments are properly placed prior to the procedure to prevent accidental removal.
- Ensure patient has a draw sheet or a friction-reducing sheet on the bed prior to repositioning.

| STEPS  | ADDITIONAL INFORMATION  |
|--|---|
| 1. Make sure you have as many additional health care providers as needed to help with the move.  | The procedure works best with two or more health care providers, depending on the size of the patient and the size of the health care professional.   |
| 2. Explain to the patient what will happen and how the patient can help.   | This provides the patient with an opportunity to ask questions and help with the positioning.   |
| 3. Raise bed to safe working height and ensure that brakes are applied. Lay patient supine.  | Principles of proper body mechanics help prevent MSI.<br><br>Safe working height is at waist level for the shortest health care provider.   |
| 4. Stand on the side of the bed the patient is moving toward.<br><br>One person stands at the shoulder area and the other person stands near the hip area, with feet shoulder width apart. | This step keeps the heaviest part of the patient closest to the centre of gravity of the health care providers.<br><br><br><i>Keep heaviest part of the patient closest to your center of gravity</i> |

|   |   |
|---|---|
| <p>5. Fan-fold the draw sheet toward the patient with palms facing up.</p>  |  <p><i>Fold sheet with fingers facing upward</i></p>  |
| <p>6. Have the health care provider at the head of the bed grasp the pillow with one hand and the draw sheet with the other hand.</p>   | <p>This prevents injury to patient.</p>  <p><i>Grasp the pillow with one hand and the draw sheet with the other</i></p> |
| <p>7. Have patient place arms across chest.</p>   | <p>This step prevents injury to patient.</p>  <p><i>Chin tucked in and arms across chest</i></p>                       |
| <p>8. Tighten your gluteal and abdominal muscles, bend your knees, and keep back straight and neutral. Place one foot in front of the other. The weight will shift from the front foot to the back during the move.</p> | <p>Use of proper body mechanics helps prevent injury when handling patients.</p>  |

9. On the count of three by the lead person, with arms tight and shoulders down, shift your weight from the front foot to the back foot. Use your large leg muscles to move the patient. Do not lift, but gently slide the patient.



*Start move with weight on front foot*

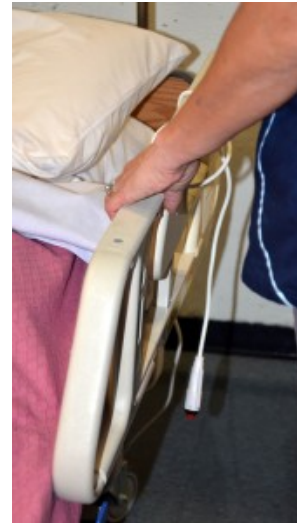


*Shift weight to back foot*

If the patient is bariatric, the move should be repeated to correctly position the patient, or use a mechanical lift.

10. Once patient is positioned toward the side of the bed, ensure pillow is comfortable under the head, and straighten sheets. Complete all other procedures related to safe patient handling.

This step promotes comfort and prevents harm to patient.



*Raise side rails*

11. Lower bed, raise side rails as required, and ensure call bell is within reach. [Perform hand hygiene.](#)

Placing bed and side rails in safe positions reduces the likelihood of injury to patient. Proper placement of call bell facilitates patient's ability to ask for assistance.



*Bed in lowest position, side rail up, call bell within reach*

Hand hygiene reduces the spread of microorganisms.

Data source: Perry et al., 2014; PHSA, 2010

[Take this \*Repositioning a Patient to One Side of the Bed\* course](#) to learn how to position a patient to one side of the bed.

### Critical Thinking Exercises

1. Name five body mechanic principles that should be used when moving a patient up in bed.
2. A health care provider completes a risk assessment for a patient and determines the patient is unable to assist with repositioning. What should the health care provider do next?
3. Your patient is experiencing shortness of breath related to heart failure. Which position in bed is best for this condition?

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## 3.6 Assisting a Patient to a Sitting Position and Ambulation

Immobility in hospitalized patients is known to cause functional decline and complications affecting the respiratory, cardiovascular, gastrointestinal, integumentary, musculoskeletal, and renal systems (Kalisch, Lee, & Dabney, 2013). For surgical patients, early ambulation is the most significant factor in preventing complications (Sanguinetti, Wild, & Fain, 2014). Lack of mobility and ambulation can be especially devastating to the older adult when the aging process causes a more rapid decline in function (Graf, 2006). Ambulation provides not only improved physical function, but also improved emotional and social well-being (Kalisch et al., 2013).

Prior to assisting a patient to ambulate, it is important to perform a patient risk assessment to determine how much assistance will be required. An assessment can evaluate a patient's muscle strength, activity tolerance, and ability to move, as well as the need to use assistive devices or find additional help. The amount of assistance will depend on the patient's condition, length of stay and procedure, and any previous mobility restrictions.

### ASSISTING PATIENT TO THE SITTING POSITION

Patients who have been immobile for a long period of time may experience **vertigo**, a sensation of dizziness, and **orthostatic hypotension**, a form of low blood pressure that occurs when changing position from lying down to sitting, making the patient feel dizzy, faint, or lightheaded (Potter, Perry, Ross-Kerr, & Wood, 2010). For this reason, always begin the ambulation process by sitting the patient on the side of the bed for a few minutes with legs dangling. Checklist 27 outlines the steps to positioning the patient on the side of a bed prior to ambulation (Perry, et al., 2014).



**Checklist 27: Assisting a Patient to a Sitting Position**


*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [additional precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Listen and attend to patient cues.
- Ensure patient's privacy and dignity.
- Assess [ABCSS/suction/oxygen/safety.](#)
- Ensure tubes and attachments are properly placed prior to the procedure to prevent accidental removal.
- Follow the principles of proper body mechanics with all patient-handling procedures

| STEPS  | ADDITIONAL INFORMATION   |
|--|--|
| <p>1. Check physician's order to ambulate and supplies for ambulation if required, and perform an assessment of patient's strength and abilities.</p> <p>Check physician orders for any restrictions related to ambulation due to medical treatment or surgical procedure.</p> | <p>Supplies (proper footwear, gait belt, or assistive devices) must be gathered prior to ambulation. Do not leave patient sitting on the side of the bed unsupervised as this poses a safety risk.</p> |
| <p>2. Explain what will happen and let the patient know how they can help.</p>   | <p>This step provides the patient with an opportunity to ask questions and help with the positioning.</p>  |
| <p>3. Lower bed and ensure brakes are applied.</p>   | <p>This prepares the work environment.</p>   |
| <p>4. Stand facing the head of the bed at a 45-degree angle with your feet apart, with one foot in front of the other. Stand next to the waist of the patient.</p>   | <p>Proper positioning helps prevent back injuries and provides support and balance.</p>  |

|  |  |
|--|--|
| <p>5. Have patient turn onto side, facing toward the caregiver. Assist patient to move close to the edge of the bed.</p>   | <p>This step prepares the patient to be moved.</p>  <p><i>Positioning patient on the side of the bed</i></p>                                     |
| <p>6. Place one hand behind patient's shoulders, supporting the neck and vertebrae.</p>  | <p>This provides support for the patient.</p>  |
| <p>7. On the count of three, instruct the patient to use their elbows to push up on the bed and then grasp the side rails, as you support the shoulders as the patient sits up. Shift weight from the front foot to the back foot.</p> | <p>Do not allow the patient to place their arms around your shoulders. This action can lead to serious back injuries.</p>  |
| <p>8. At the same time as you're shifting your weight, gently grasp the patient's outer thighs with your other hand and help the patient slide their feet off the bed to dangle or touch the floor.</p>                                | <p>This step helps the patient sit up and move legs off the bed at the same time.</p>  <p><i>Assisting patient into a sitting position</i></p> |
| <p>9. Bend your knees and keep back straight and neutral.</p>  | <p>Use of proper body mechanics helps prevent injury when handling patients.</p>   |

|  |  |
|--|--|
| <p>10. On the count of three, gently raise the patient to sitting position. Ask patient to push against bed with the arm closest to the bed, at the same time as you shift your weight from the front foot to the back foot.</p> | <p>This allows the patient to help with the process and prevents injury to the health care provider.</p>  <p><i>Assist into a sitting position</i></p> |
| <p>11. Assess patient for orthostatic hypotension or vertigo.</p>  | <p>If patient is not dizzy or lightheaded, the patient is safe to ambulate.</p> <p>If patient becomes dizzy or faint, lay patient back down on bed.</p>  |
| <p>12. Continue with mobilization procedures as required.</p>  | <p>Mobilization helps prevent complications and improves physical function in hospitalized patients.</p>   |
| <p>Data source: ATI, 2015b; Interior Health, 2013; Perry et al., 2014; PHSA, 2010</p>  |  |

VIDEO 3.2

Watch the video [Sit to Stand Mechanical Assist](#) by [Renée Anderson & Wendy McKenzie](#), Thompson Rivers University.

**AMBULATING A PATIENT**


**Ambulation** is defined as moving a patient from one place to another (Potter et al., 2010). Once a patient is assessed as safe to ambulate, determine if assistance from additional health care providers or assistive devices is required. Checklist 28 reviews the steps to ambulating a patient with and without a gait belt.

**Checklist 28: Ambulating a Patient**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [additional precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Listen and attend to patient cues.
- Ensure patient's privacy and dignity.
- Assess [ABCCS/suction/oxygen/safety.](#)
- Ensure tubes and attachments are properly placed prior to the procedure to prevent accidental removal.
- Bring in required assistive devices and proper footwear.

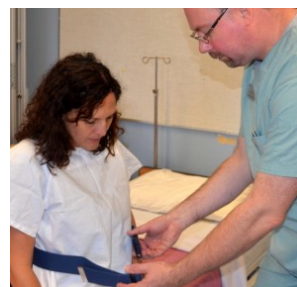
| STEPS  | ADDITIONAL INFORMATION  |
|--|---|
| <p>1. Ensure patient does not feel dizzy or lightheaded and is tolerating the upright position.</p> <p>Instruct the patient to sit on the side of the bed first, prior to ambulation.</p> <p>Ensure proper footwear is on patient, and let patient know how far you will be ambulating. Proper footwear is non-slip or slip resistant footwear. Socks are not considered proper footwear.</p> <p>Check physician's orders for any activity restrictions related to treatment or surgical procedures.</p> | <p>Proper footwear is essential to prevent accidental falls.</p>  <p><i>Footwear</i></p> |

2. Apply gait belt snugly around the patient's waist if required.



*Assessment and instructions prior to ambulation*

Gait belts are applied over clothing.



*Apply gait belt over clothing*



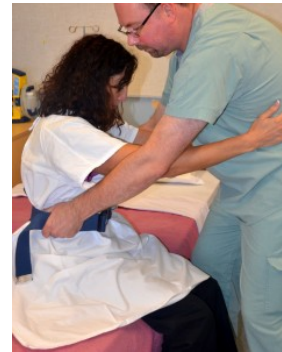
*Gait belt should be snug, not tight*

3. Assist patient by standing in front of the patient, grasping each side of the gait belt, keeping back straight and knees bent.

The patient should be cooperative and predictable, able to bear weight on own legs and to have good trunk control. Apply gait belt if required for additional support.

4. While holding the belt, gently rock back and forth three times. On the third time, pull patient into a standing position.

This action provides momentum to help patient into a standing position.



*Rock back and forth to provide momentum*

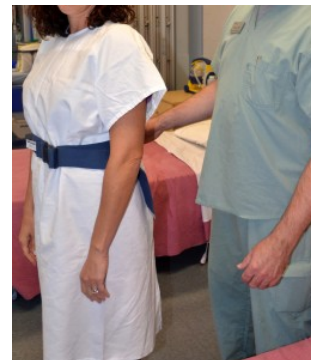


*Pulled to a standing position*

5. Once patient is standing and feels stable, move to the unaffected side and grasp the gait belt in the middle of the back. With the other hand, hold the patient's hand closest to you.

Standing to the side of the patient provides assistance without blocking the patient.

If the patient does not require a gait belt, place hand closest to the patient around the upper arm and hold the patient's hand with your other hand.



*Assisting ambulation with a gait belt*



6. Before stepping away from the bed, ask the patient if they feel dizzy or lightheaded. If they do, sit patient back down on the bed.

Always perform a [risk assessment prior to ambulation](#).

If patient feels stable, begin walking, matching your steps to the patient's. Instruct patient to look ahead and lift each foot off the ground.

Walk only as far as the patient can tolerate without feeling dizzy or weak.

Ask patient how they feel during ambulation.

|   |   |
|---|---|
| <p>7. To help a patient back to bed, have patient stand with back of knees touching the bed. Grasp the gait belt and help patient into a sitting position, keeping your back straight and knees bent.</p> | <p>Allowing a patient to rest after ambulation helps prevent fatigue.</p>   |
| <p>8. When patient is finished ambulating, remove gait belt and settle patient into bed or a chair.</p>   | <p>This provides a safe place for the patient to rest.</p>  <p><i>Remove gait belt</i></p>   |
| <p>9. When patient returns to bed, place the bed in lowest position, raise side rails as required, and ensure call bell is within reach. <a href="#">Perform hand hygiene.</a></p>                        | <p>Placing bed and side rails in a safe position reduces the likelihood of injury to patient. Proper placement of call bell facilitates patient’s ability to ask for assistance.</p>  <p><i>Bed in the lowest position, call bell in reach, and side rail up</i></p> <p>Hand hygiene reduces the spread of microorganisms.</p> |
| <p>10. Document patient’s ability to tolerate ambulation and type of assistance required.</p>   | <p>This provides a baseline of patient’s abilities and promotes clear communication between health care providers.</p>  |
| <p>Data source: ATI, 2015b; Interior Health, 2013; Perry et al., 2014; PHSA, 2010</p>   |   |

VIDEO 3.3

Watch the video [How to Ambulate With or Without a Gait Belt or Transfer Belt](#) by Kim Morris, Thompson Rivers University.

VIDEO 3.4

Watch the video [How to Ambulate with a Cane](#) by Kim Morris of Thompson Rivers University.

VIDEO 3.5

Watch a video [How to Ambulate With Crutches](#) by Kim Morris, Thompson Rivers University.

Critical Thinking Exercises

1. A 90-year-old male patient is required to ambulate. He had a total hip arthroplasty and is post-operative day 3 (POD 3). What risk factors should be considered prior to ambulating an elderly patient who has been immobile after hip surgery?
2. Does ambulation require a physician's order?
3. What should you do if a patient feels dizzy or lightheaded before ambulation?



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## 3.7 Patient Transfers

**Transfers** are defined as moving a patient from one flat surface to another, such as from a bed to a stretcher (Perry et al., 2014). Types of hospital transfers include bed to stretcher, bed to wheelchair, wheelchair to chair, and wheelchair to toilet, and vice versa.

### **PATIENT TRANSFER FROM BED TO STRETCHER**

A bed to stretcher transfer requires a minimum of three to four people, depending on the size of the patient and the size and strength of the health care providers. Patients who require this type of transfer are generally immobile or acutely ill and may be unable to assist with the transfer. Checklist 29 shows the steps for moving patients laterally from one surface to another.



**Checklist 29: Moving a Patient from Bed to Stretcher**




*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*



*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [additional precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Listen and attend to patient cues.
- Ensure patient’s privacy and dignity.
- Assess [ABCSS/suction/oxygen/safety.](#)
- Ensure tubes and attachments are properly placed prior to the procedure to prevent accidental removal.
- A slider board and full-size sheet or friction-reducing sheet is required for the transfer.

| STEPS   | ADDITIONAL INFORMATION   |
|---|--|
| <p>1. Always predetermine the number of staff required to safely transfer a patient horizontally.</p>                         | <p>Three to four health care providers are required for the transfer.</p>  |
| <p>2. Explain what will happen and how the patient can help (tuck chin in, keep hands on chest).</p> <p>Collect supplies.</p> | <p>This step provides the patient with an opportunity to ask questions and help with the transfer.</p> <div> </div> <p><i>Stretcher and slider board</i></p> <div> </div> <p><i>Chin tucked in and arms across chest</i></p> |

|   |   |
|---|---|
| <p>3. Raise bed to safe working height. Lower head of bed and side rails.</p> <p>Position the patient closest to the side of the bed where the stretcher will be placed.</p>  | <p>Safe working height is at waist level for the shortest health care provider.</p> <p>The patient must be positioned correctly prior to the transfer to avoid straining and reaching.</p> <p>May need additional health care providers to move patient to the side of the bed.</p>   |
| <p>4. Roll patient over and place slider board halfway under the patient, forming a bridge between the bed and the stretcher.</p> <p>Place sheet on top of the slider board. The sheet is used to slide patient over to the stretcher.</p> <p>The patient is returned to the supine position.</p> <p>Patient's feet are positioned on the slider board.</p>   | <p>The slider board must be positioned as a bridge between both surfaces.</p> <p>The sheet must be between the patient and the slider board to decrease friction between patient and board.</p>  <p><i>Place slider board</i></p> <p>Ensure all tubes and attachments are out of the way.</p> |
| <p>5. Position stretcher beside the bed on the side closest to the patient, with stretcher slightly lower. Apply brakes.</p> <p>Two health care providers climb onto the stretcher and grasp the sheet. The lead person is at the head of the bed and will grasp the pillow and sheet. The other health care provider is positioned on the far side of the bed, between the chest and hips of the patient, and will grasp the sheet with palms facing up.</p> <p>The two caregivers on the stretcher grasp the draw sheet using a palms up technique, sitting up tall, and keeping their elbows close to their body and backs straight.</p> | <p>The position of the health care providers keeps the heaviest part of the patient near the health care providers' centre of gravity for stability.</p>  <p><i>Caregiver at the head of the bed</i></p>  |
| <p>6. The caregiver on the other side of the bed places his or her hands under the patient's hip and shoulder area with forearms resting on bed.</p>  |   |

|   |   |
|---|---|
| <p>7. The designated leader will count 1, 2, 3, and start the move.</p> <p>The person on the far side of the bed will push patient just to arm's length using a back-to-front weight shift.</p> <p>At the same time, the two caregivers on the stretcher will move from a sitting-up-tall position to sitting on their heels, shifting their weight from the front leg to the back, bringing the patient with them using the sheet.</p> | <p>Coordinating the move between health care providers prevents injury while transferring patients.</p> <p>Using a weight shift from front to back uses the legs to minimize effort when moving a patient.</p>  |
| <p>8. The two caregivers will climb off the stretcher and stand at the side and grasp the sheet, keeping elbows tucked in.</p> <p>One of the two caregivers should be in line with the patient's shoulders and the other should be at the hip area.</p> <p>On the count of three, with back straight and knees bent, the two caregivers use a front-to-back weight shift and slide the patient into the middle of the bed.</p>          | <p>The step allows the patient to be properly positioned in the bed and prevents back injury to health care providers.</p>  <p><i>Caregiver at the head of the bed</i></p>  <p><i>Weight on front leg</i></p>  <p><i>Shift weight to back foot</i></p> |
| <p>9. At the same time, the caregiver on the other side slides the slider board out from under the patient.</p>   | <p>This step allows the patient to lie flat on the bed.</p>   |

|  |   |
|--|---|
| <p>10. Replace pillow under head, ensure patient is comfortable, and cover the patient with sheets.</p>  | <p>This promotes comfort and prevents harm to patient.</p>  |
| <p>11. Lower bed and lock brakes, raise side rails as required, and ensure call bell is within reach.</p> <p><a href="#">Perform hand hygiene.</a></p> | <p>Placing bed and side rails in a safe position reduces the likelihood of injury to patient. Proper placement of call bell facilitates patient's ability to ask for assistance.</p>  <p><i>Bed in lowest position, side rail up, call bell within reach</i></p> <p>Hand hygiene reduces the spread of microorganisms.</p>  <p><i>Hand hygiene with ABHR</i></p> |
| <p>Data source: ATI, 2015c; Perry et al., 2014; PHSA, 2010</p>   |   |

[Take this Lateral Transfer Sliding Board course](#) for more information on sliding board transfer.

## TRANSFER FROM BED TO WHEELCHAIR

Patients often need assistance when moving from a bed to a wheelchair. A patient must be cooperative and predictable, able to bear weight on both legs and take small steps. If any of these criteria are not met, a two-person transfer or mechanical lift is recommended. Always complete a patient risk assessment prior to all patient-handling activities. See Checklist 30 for the steps to transfer a patient from the bed to the wheelchair (PHSA, 2010).

**Checklist 30: Bed to Wheelchair Transfer**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- Check room for [additional precautions](#).
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Listen and attend to patient cues.
- Ensure patient’s privacy and dignity.
- Assess [ABCSS/suction/oxygen/safety](#).
- Ensure tubes and attachments are properly placed prior to the procedure to prevent accidental removal.
- A gait belt and wheelchair are required.

**STEPS**

**ADDITIONAL INFORMATION**

1. One health care provider is required.

The patient should be assessed as a 1-person assist.

2. [Perform hand hygiene](#). Explain what will happen during the transfer and how the patient can help.

This step provides the patient with an opportunity to ask questions and help with the positioning.

Apply proper footwear prior to ambulation



*Explain procedure to patient*



*Proper footwear*

3. Lower the bed and ensure that brakes are applied.

Place the wheelchair next to the bed at a 45-degree angle and apply brakes. If a patient has weakness on one side, place the wheelchair on the strong side.

Ensure brakes are applied on the wheelchair.

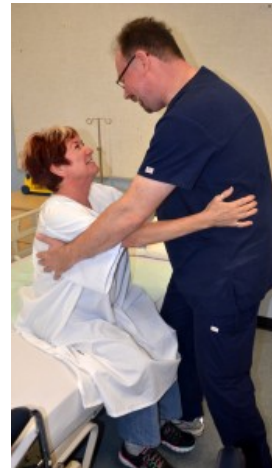


*Wheelchair with one leg rest removed*

4. Sit patient on the side of the bed with his or her feet on the floor. Apply the gait belt snugly around the waist (if required).

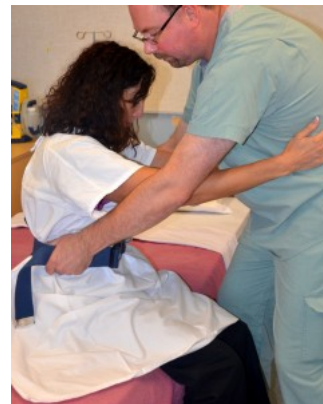
Place hands on waist to assist into a standing position

The patient's feet should be in between the health care provider's feet.



*Patient position prior to standing*

5. As the patient leans forward, grasp the gait belt (if required) on the side the patient, with your arms outside the patient's arms. Position your legs on the outside of the patient's legs. The patient's feet should be flat on the floor.



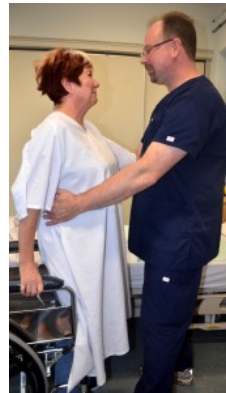
*Assist to a standing position using a gait belt*

6. Count to three and, using a rocking motion, help the patient stand by shifting weight from the front foot to the back foot, keeping elbows in and back straight.



*Weight shift to back leg by health care provider*

7. Once standing, have the patient take a few steps back until they can feel the wheelchair on the back of their legs. Have patient grasp the arm of the wheelchair and lean forward slightly.



*Assist into the wheelchair*

8. As the patient sits down, shift your weight from back to front with bent knees, with trunk straight and elbows slightly bent. Allow patient to sit in wheelchair slowly, using armrests for support.



*Transfer to wheelchair*

Ensure the patient can feel the wheelchair on the back of the legs prior to sitting down.

This allows the patient to be properly positioned in the chair and prevents back injury to health care providers.

Data source: ATI, 2015b; Perry et al., 2014; PHSA, 2010

*Special considerations:*

- Do not allow patients to place their arms around your neck. Have them place their arms around your hips.
- Avoid lifting patients. Let them stand using their own strength.
- Stay close to your patient during the transfer to keep the patient's weight close to your centre of gravity
- If the patient has weakness on one side of the body (e.g., due to a **cerebral vascular accident** — **CVA** — or stroke), place the wheelchair on the strong side.

VIDEO 3.6

Watch the video [Assisting from Bed to Chair with a Gait Belt or Transfer Belt](#) by Kim Morris, Thompson Rivers University.

[Take this Standing Step Around Transfer course](#) to learn the method for a bed to wheelchair transfer.

Critical Thinking Exercises

1. Prior to moving the patient, where should the patient's feet be placed?
2. As you start to stand your patient, the patient gently places his arms around your neck. How do you proceed?



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## 3.8 Fall Prevention


Patient falls are the most reported patient safety events in British Columbia and account for 40% of all adverse events (BCPSLS, 2015). Falls are a major priority in health care, and health care providers are responsible for identifying, managing, and eliminating potential hazards to patients. All patient-handling activities (positioning, transfers, and ambulation) pose a risk to patients and health care providers. Older adults may be at increased risk for falls due to impaired mental status, decreased strength, impaired balance and mobility, and decreased sensory perception (Titler, Shever, Kanak, Picone, & Qin, 2011). Other patients may be at risk due to gait problems, cognitive ability, visual problems, urinary frequency, generalized weakness, and cognitive dysfunction. Specific treatments and medications may cause hypotension or drowsiness, which increase a patient's risk for falls (Hook & Winchel, 2006).

### **FALL PREVENTION STRATEGIES**

All clients should be assessed for risk factors, and necessary prevention measures should be implemented as per agency policy. Table 3.7 lists factors that affect patient safety and general measures to prevent falls in health care.

**Table 3.7 Fall Prevention Strategies**

| <p><i>Prior to ambulation consider the following risk factors:</i></p> <ul style="list-style-type: none"> <li>• Age (elderly)</li> <li>• Sensory-perception alteration</li> <li>• Cognitive impairment (decreased LOC, confusion)</li> <li>• Poly-pharmacology</li> <li>• Urinary incontinence</li> <li>• Ability to communicate (language barriers)</li> <li>• Lack of safety awareness (height of bed, attachments and tubes)</li> <li>• Environmental factors (dim light, tripping hazards, uneven floors)</li> </ul> |  |
|--|--|
| PREVENTION STRATEGIES  | SAFETY MEASURES  |
| Look for fall risk factors in all patients.  | Identifying specific factors helps you implement specific preventive measures. Risk factors include age, weakness on one side, the use of a cane or walker, history of dizziness or lightheadedness, low blood pressure, and weakness. |
| Follow hospital guidelines for transfers.  | Transfer guidelines provide a good baseline for further patient risk assessments.  |
| Orient patient to surroundings.  | Orient patients to bed, surroundings, location of bathroom and call bell, and tripping hazards in the surrounding environment.   |
| Answer call bells promptly.  | Long wait times may encourage unstable patients to ambulate independently.   |
| Ensure basic elimination and personal needs are met.   | Provide opportunities for patients to use the bathroom and to ask for water, pain medication, or a blanket.  |

|  |   |
|--|---|
| <p>Ensure patient has proper footwear and mobility aids.</p>   | <p>Proper footwear prevents slips.</p>  <p><i>Proper Footwear</i></p>                         |
| <p>Communicate with your patients.</p>   | <p>Let patients know when you will be back, and how you will help them ambulate</p>   |
| <p>Keep bed in the lowest position for sedated, unconscious, or compromised patients.</p>  | <p>This step prevents injury to patients.</p>   |
| <p>Avoid using side rails when a patient is confused.</p>  | <p>Side rails may create a barrier that can be easily climbed and create a fall risk situation for confused patients.</p>   |
| <p>Keep assistive devices and other commonly used items close by.</p>  | <p>Allow patients to access assistive devices quickly and safely. Items such as the call bell, water, and Kleenex should be kept close by, to avoid any excessive reaching.</p> |
| <p>Data source: Accreditation Canada, 2014; Canadian Patient Safety Institute, 2015; Perry et al., 2014; Titler et al., 2011</p> |   |

## LOWERING A PATIENT TO THE FLOOR



A patient may fall while ambulating or being transferred from one surface to another. If a patient begins to fall from a standing position, do not attempt to stop the fall or catch the patient. Instead, control the fall by lowering the patient to the floor. Checklist 31 lists the steps to assisting a patient to the floor to minimize injury to patient and health care provider (PHSA, 2010).



**Checklist 31: Lowering a Patient to the Floor**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- There is always a potential fall risk during transfers and ambulation. Prevention is key.
- If a patient begins to feel dizzy, have them sit on a chair or the floor to avoid a fall.
- The head is the most important part of the body; always protect it as much as possible.
- In the event of a fall, stay with the patient until help arrives.
- After a fall, always assess a patient for injuries prior to moving them. If the patient remains weak or dizzy, do not attempt to ambulate them. Seek help.

| STEPS  | ADDITIONAL INFORMATION  |
|--|---|
| <p>1. If a patient starts to fall and you are close by, move behind the patient and take one step back.</p>                                  | <p>Look and be attentive to cues if a patient is feeling dizzy or weak.</p>  <p><i>Stand behind patient</i></p>  |
| <p>2. Support the patient around the waist or hip area, or grab the gait belt. Bend your leg and place it in between the patient's legs.</p> | <p>Hand placement allows for a solid grip on the patient to guide the fall.</p>  <p><i>Support patient by grabbing the hip area or gait belt</i></p> |

|  |  |
|--|--|
| <p>3. Slowly slide the patient down your leg, lowering yourself at the same time. Always protect the head first.</p> | <p>Lowering yourself with the patient prevents back injury and allows you to protect the patient's head from hitting the floor or hard objects.</p>  <p><i>Lower patient to the floor</i></p> |
| <p>4. Once the patient is on the floor, assess the patient for injuries prior to moving.</p>                         | <p>Assesses patient's ability, or need for additional help, to get off the floor.</p>  <p><i>Assess patient prior to moving</i></p>  |
| <p>5. Provide reassurance and seek assistance if required.</p>   | <p>If required, stay with the patient and call out for help.</p>   |
| <p>6. If patient is unable to get up off the floor, use a mechanical lift.</p>                                       | <p>If patient still feels dizzy or weak, using a mechanical lift will prevent injury.</p>  |
| <p>7. Complete an incident report according to agency policy.</p>  | <p>An incident report helps identify and manage risks related to patient falls.</p>  |
| <p>Data source: Perry et al., 2014; PHSA, 2010; Titler et al., 2011</p>  |  |

*Special considerations:*

- Use a falls risk assessment tool for all patients according to agency policy.
- Younger patients may not be aware of the effects of medication and treatments leading to dizziness and orthostatic hypotension.
- Inform patients and family members about the potential risks for falls in the hospital. If informed, people are more likely to call for assistance.
- Always ensure call bell is in place. Many falls occur due to incontinence issues. The call bell allows patient and family to obtain assistance quickly.
- If appropriate, educate patient about home maintenance and safety to prevent falls when returning home.
- Fall prevention is interdisciplinary. Proper communication by the care team is required to

prevent falls.

[Take this \*Lowering a Patient to the Floor\* course](#) for more information on lowering a falling patient to the floor.

#### VIDEO 3.7

Watch the video [Assisted Fall](#) by Kim Morris, Thompson Rivers University.

#### Critical Thinking Exercises

1. Name four fall prevention strategies that will help keep a patient safe when ambulating in the hospital.
2. A patient is ambulating for the first time after surgery. Is it safe to encourage the patient to ambulate independently?
3. Many physiological risk factors can be identified from a routine assessment. Name three risk factors and three prevention strategies to manage these risks. For example, if a patient has frequent toileting needs, a preventive action is to offer assistance to the toilet every hour, and to ensure the call bell is within reach at all times.

## Additional Videos

#### VIDEO 3.8

Watch the video [How to Use a Hammock Sling](#) by Kim Morris, Thompson Rivers University.

VIDEO 3.9

Watch the video [How to Use a Hygiene Sling](#) by Kim Morris, Thompson Rivers University.



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## 3.9 Summary

To use the principles of body mechanics effectively and safely, health care providers must have the required training to perform a risk assessment, knowledge about transfer assistive devices, and an understanding of the procedures for safe patient handling. In addition, knowing risk factors for positioning, transferring, and ambulation, along with understanding falls prevention, will help prevent injuries to staff and patients. The goal of this chapter has been to help reduce the incidence and severity of injuries related to patient-handling procedures.

### Key Takeaways

- Patients' conditions and their ability to move will change over the course of their hospital stay. A patient risk assessment must be done prior to all patient-handling procedures.
- MSI can result from any type of handling procedure. The principles of proper body mechanics can be applied to all procedures related to positioning, transferring, and ambulation. Correct posture and keeping the patient close to your centre of gravity is essential to maintain balance during transfers, positioning, and ambulation.
- Educate yourself on standard procedures to protect yourself from injury. Retrain and keep current with new procedures and assistive devices.
- The use of assistive devices can help a patient transfer safely and effectively.
- Always seek additional assistance and help as required.
- Keep yourself healthy with exercise and a proper diet, along with suitable footwear to help prevent injury. If an MSI is suspected, seek help immediately and report the incident.
- Avoid trying to catch a falling patient. If possible, follow the guidelines to lower a falling patient to the floor.
- Be proactive to implement safe strategies and prevent hazards in the workplace related to patient handling.

### SUGGESTED ONLINE RESOURCES

1. [Agency for Healthcare Research and Quality: Which fall prevention practices do you want to use?](#) These universal fall risk precautions review physiological anticipated, unanticipated, and environmental hazards with a focus on identifying risk factors and prevention strategies.
2. [BC Interior Health: Safe patient handling.](#) This website lists excellent resources including brochures and videos about topics related to body mechanics, transfers, positions, and performing risk assessments.
3. [BC Patient Safety & Quality Council: 48/6 Model of care.](#) This resource offers a model of

care for hospitalized seniors (aged 70 and older) in British Columbia. It is an integrated care initiative that addresses six care areas of functioning through patient screening and assessment (assessments are completed only where screening shows areas of concern) within the first 48 hours of hospital admission.

4. [Canadian Fall Prevention Education Collaborative: Canadian falls prevention curriculum](#). This website provides information and tool kits for preventing falls in the community and acute care settings.
5. [Centers for Disease Control and Prevention: Safe patient handling training for schools of nursing](#). This resource was developed by the World Health Organization to create global awareness. It provides up-to-date algorithms for patient transfers.
6. [Provincial Health Services Authority: Patient handling guidelines](#). These instructional video courses cover numerous topics including mechanical (ceiling) lifts, additional repositioning techniques, transfers, and assisting a patient off the floor.
7. [WorkSafeBC: High-risk manual handling of patients in health care](#). This document provides guidelines for moving patients when health care providers are at high risk of injury.
8. [WorkSafeBC: Resources – by industry – health care](#). This website addresses body mechanics, MSI prevention, and the use of transfer assistive devices in health care.

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## Chapter 4. Wound Care



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## 4.1 Introduction

Wound healing is a complex physiological process. It occurs after an injury in the cells and tissues of our bodies to restore function of the tissue. The healing process is affected by the severity of the wound, location, extent of injury, and other external and internal factors that will either inhibit or promote wound healing. A health care provider must understand how to assess a wound, assess external and internal factors, and determine treatment to optimize the healing process.

### Learning Objectives

- Identify factors that affect wound healing
- Describe the stages of wound healing
- Perform a comprehensive wound assessment
- Describe how to complete a simple dressing change and a wet to dry dressing change
- Review how to irrigate a wound and remove sutures and staples
- Describe care for a wound-drainage system
- Outline steps for removing a wound drain



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## 4.2 Wound Healing and Assessment

Wound healing is a dynamic process of restoring the anatomic function of living tissue. Since damage to the body's tissue is common, the body is well adapted to utilizing mechanisms of repair and defence to elicit the healing process. Normal wound healing is profoundly influenced by the type of injury and by factors about the wound (intrinsic) and within the patient (extrinsic) (Perry, Potter, & Ostendorf, 2014).

### PHASES OF WOUND HEALING

There are four distinct phases of wound healing. These four phases must occur in correct sequence and in a correct time frame to allow the layers of the skin to heal (see Figure 4.1). Table 4.1 describes how a wound heals.

**Table 4.1 Phases of Wound Healing for Full Thickness Wounds**

| <b>Phase</b>                   | <b>Additional Information</b>   |
|--------------------------------|---|
| Hemostasis phase               | Blood vessels constrict and clotting factors are activated. Clot formation blocks the bleeding and acts as a barrier to prevent bacterial contamination. Platelets release growth factors, which alert various cells to start the repair process at the wound location.   |
| Inflammatory phase             | Vasodilation occurs, allowing plasma and leukocytes (white blood cells) into the wound to start cleaning the wound bed. This process is seen as edema, erythema, and exudate. Macrophages (another type of white blood cell) work to regulate the cleanup.  |
| Proliferative phase            | Four important processes occur in this phase: <ol style="list-style-type: none"><li>1. Epithelialization: new epidermis and granulation tissue are developed</li><li>2. New capillaries: angiogenesis occurs to bring oxygen and nutrients to the wound</li><li>3. Collagen formation: this provides strength and integrity to the wound</li><li>4. Contraction: the wound begins to reduce in size</li></ol> |
| Maturation (remodelling) phase | Collagen continues to strengthen the wound, and the wound becomes a scar.   |

Data source: British Columbia Provincial Nursing Skin and Wound Committee, 2011; Perry et al., 2014

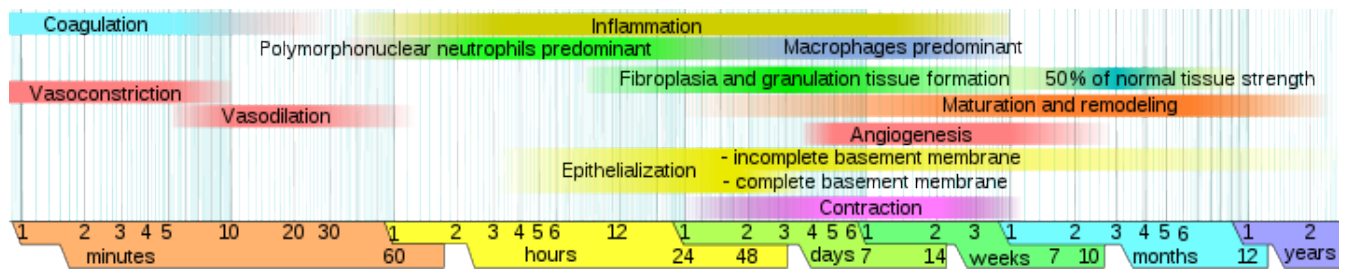


Figure 4.1 Phases of wound healing

## TYPES OF WOUNDS

To determine how to treat a wound, consider the etiology, amount of exudate, and available products to plan appropriate treatment. Wounds are classified as acute (healing occurs in a short time frame without complications) or chronic (healing occurs over weeks to years, and treatment is usually complex). Examples of acute wounds include a surgical incision or a traumatic wound (e.g., a gunshot wound). Examples of chronic wounds include venous and arterial ulcers, diabetic ulcers, and pressure ulcers. Table 4.2 lists the six main types of wounds.

**Table 4.2 Types of Wounds**

| <b>Type</b>                       | <b>Additional Information</b>  |
|-----------------------------------|--|
| Surgical                          | <p>Healing occurs by primary, secondary, or tertiary intention.</p> <p><b>Primary intention</b> is where the edges are sutured or stapled closed, and the wound heals quickly with minimal tissue loss. The healing time for a surgical wound is usually short, depending on the surgery.</p> <p>A surgical wound left open to heal by scar formation is a wound healed by <b>secondary intention</b>. In this type of wound, there is a loss of skin, and granulation tissue fills the area left open. Healing is slow, which places the patient at risk for infection. Examples of wounds healing by secondary intention include severe lacerations or massive surgical interventions.</p> <p>Healing by <b>tertiary intention</b> is the intentional delay in closing a wound. On occasion, wounds are left open (covered by a sterile dressing) to allow an infection or inflammation to subside. Once the wound is closed with staples or sutures, the scarring is minimal.</p> |
| Traumatic                         | Examples are gunshot wounds, stab wounds, or abrasions. These wounds may be acute or chronic.  |
| Diabetic/<br>neuropathic<br>ulcer | This is a nerve disorder that results in the loss or impaired function of the tissues affecting nerve fibres. These wounds generally occur as a result of damage to the autonomic, sensory, or motor nerves and have an arterial perfusion deficit. They are usually located in the lower extremity on the foot. Diabetic/neuropathic ulcers are often small with a calloused edge. Pain may be absent or severe depending on the neuropathy.  |
| Arterial<br>ulcer                 | <p>Arterial ulcers occur when tissue ischemia occurs due to arterial insufficiency from the narrowing of an artery by an obstruction (atherosclerosis). They are located on the distal aspects of the arterial circulation, and can be anywhere on the legs, including feet or toes. Wound margins are well defined with a pale wound bed with little or no granulation. Necrotic tissue is often present. There is minimal to no exudate present. Pedal pulses are usually absent or diminished. Pain occurs in limb at rest, at night, or when limb is elevated.</p> <p>Arterial ulcers account for 5% to 20% of all leg ulcers. Perfusion must be assessed prior to initiating treatment.</p>   |
| Venous<br>ulcer                   | <p>A venous ulcer is a lower extremity wound. Tissue ischemia occurs due to the failure of the venous valve function to return blood from the lower extremities to the heart. It is usually located in the ankle to mid-calf region, usually medial or lateral, and can be circumferential. Drainage can be moderate to heavy. A venous ulcer can be irregularly shaped, large, and shallow with generalized edema to lower limbs. Pulse may be difficult to palpate.</p> <p>Venous ulcers account for 70% to 90% of all leg ulcers. Perfusion must be assessed prior to initiating treatment.</p>   |
| Pressure<br>ulcer                 | Also known as a pressure sore or decubiti wound, the pressure ulcer is a localized area of tissue damage that results from compression of soft tissue between a hard surface and a bony prominence (coccyx, ankle, shoulder blade, or hip). As blood supply decreases to the area of compression, tissue anoxia occurs, which can lead to eventual tissue death. Wounds are usually circular and may have viable or necrotic tissue, and exudate can vary from none to heavy. Pressure ulcers are classified depending on the level of tissue damage (stages 1 to 4). Treatment is based on stage, exudate, type of available dressing, and frequency of dressing changes.   |

Data source: British Columbia Provincial Nursing Skin and Wound Committee, 2011, 2014; Perry et al., 2014

## WOUND HEALING

Wounds require different treatment throughout the phases of healing. There are multiple factors that affect how a wound heals as it moves through the phases of healing. It is important to look at the “whole patient” rather than the “hole in the patient” to identify the correct treatment and work efficiently and effectively from the beginning of the healing process.

Table 4.3 lists a number of factors that inhibit the ability of tissues and cells to regenerate, which can delay healing and contribute to wound infections.

**Table 4.3: Patient Considerations for Wound Healing**

| <b>Influencing Factors</b>  | <b>Additional Information</b>   |
|---|---|
| Patient's age   | Vascular changes occur with increasing age, skin is less pliable, and scar tissue is tighter.<br><br>For example, an older adult's skin tears more easily from mechanical trauma such as tape removal.  |
| Patient's nutritional status  | Tissue repair and infection resistance are directly related to adequate nutrition.<br><br>Patients who are malnourished are at increased risk for wound infections and wound infection-related sepsis.  |
| Patient's size  | Inadequate vascularization due to obesity will decrease the delivery of nutrients and cellular elements required for healing.<br><br>An obese person is at greater risk for wound infection and dehiscence or evisceration.   |
| Oxygenation   | Factors such as decreased hemoglobin level, smoking, and underlying cardiopulmonary conditions will decrease oxygenation.<br><br>Adequate oxygenation at the tissue level is essential for adequate tissue repair.<br><br>Hemoglobin level and oxygen release to tissues is reduced in smokers. |
| Patient's medications   | Steroids reduce the inflammatory response and slow collagen synthesis.<br><br>Cortisone depresses fibroblast activity and capillary growth.<br><br>Chemotherapy depresses bone marrow production of white blood cells and impairs immune function.  |
| Chronic diseases or trauma  | Chronic diseases and traumas such as diabetes mellitus or radiation decrease tissue perfusion and oxygen release to tissues.  |
| Data source: Gallagher-Camden, 2012; Perry et al., 2014; Stotts, 2012 |   |

Watch this 30-minute [video about how wounds heal](#) from Connecting Learners with Knowledge (CLWK), a provincial resource.

## WOUND ASSESSMENT

Frequent wound assessment based on the type, cause, and characteristics of the wound is necessary to help determine the type of treatment required to manage the wound effectively and to promote maximal healing. The health care professional should always compare the wound to the previous assessment to determine progress toward healing. If there has been no improvement in the healing of the wound, alternative options or consulting a wound care specialist should be considered.

Checklist 32 outlines the steps to take when assessing a wound.

**Checklist 32: Wound Assessment**

| <i>Disclaimer: Always review and follow your hospital policy regarding this specific skill.</i>     |   |
|---|---|
| STEPS   | ADDITIONAL INFORMATION  |
| 1. Location   | Note the anatomic position of the wound on the body.  |
| 2. Type of wound  | Note the etiology (cause) of the wound (i.e., surgical, pressure, trauma).<br><br>Common types are pressure, venous, arterial, or neuropathic/diabetic foot ulcers, or surgical or trauma wounds.   |
| 3. Extent of tissue involvement   | A full-thickness wound involves both the dermis and epidermis.<br><br>A partial-thickness wound involves only the epidermal layer.<br><br>If the wound is a pressure ulcer, use the <a href="#">Braden Scale Interventions Algorithm</a> .  |
| 4. Type and percentage of tissue in wound base  | Describe the type of tissue (i.e., granulation, slough, eschar) and the approximate amount.   |
| 5. Wound size   | Follow agency policy to measure wound dimensions, including width, depth, and length.<br><br>Assess for a sinus tract, tunnelling, or induration.   |
| 6. Wound exudate  | Describe the amount, colour, and consistency: <ul style="list-style-type: none"> <li>• Serous drainage (plasma): clear or light yellowish</li> <li>• Sanguineous drainage (fresh bleeding): bright red</li> <li>• Serosanguineous drainage (a mix of blood and serous fluid): pink</li> <li>• Purulent drainage (infected): thick and yellow, pale green, or white</li> </ul> |
| 7. Presence of odour  | Note the presence or absence of odour. The presence of odour may indicate infection.  |
| 8. Peri-wound area  | Assess the temperature, colour, and integrity of the skin surrounding the wound.  |
| 9. Pain   | Assess pain using <a href="#">LOTTAARP</a> .  |
| Data source: British Columbia Provincial Nursing Skin and Wound Committee, 2014; Perry et al., 2014 |   |

[Watch this 30-minute Wound Assessment video](#), a provincial resource from CLWK, to learn how to improve wound-assessment skills.

#### Critical Thinking Exercises

1. Your patient is 75 years old, smokes cigarettes, has renal disease, and is overweight. What additional factors should you consider prior to assessing the patient's wound?
2. What phase of wound healing is indicated by the presence of epithelialization and wound contraction?

#### ATTRIBUTION

##### Figure 4.1

[Phases of wound healing](#) by [Mikael Häggström](#) is in the [public domain](#).



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## 4.3 Simple Dressing Change

The health care provider chooses the appropriate sterile technique and necessary supplies based on the clinical condition of the patient, the cause of the wound, the type of dressing procedure, the goal of care, and agency policy.

Agency policy will determine the type of wound cleansing solution, but sterile normal saline and sterile water are the solutions of choice for cleansing wounds and should be at room temperature to support wound healing.

For more complex wounds with delayed healing, antiseptic solutions such as povidone iodine or chlorhexidene may be used for cleansing based on agency policy and the recommendation of a wound clinician or physician.



Checklist 33 outlines the steps for performing a simple dressing change.




### Checklist 33: Simple Dressing Change




*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*




*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [additional precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Explain process to patient; offer analgesia, bathroom, etc.
- Listen and attend to patient cues.
- Ensure patient’s privacy and dignity.
- Assess [ABCSS/suction/oxygen/safety.](#)

| STEPS   | ADDITIONAL INFORMATION   |
|---|--|
| <p>1. Check present dressing with non-sterile gloves.</p> | <p>Use non-sterile gloves to protect yourself from contamination.</p>  <p><i>Apply non-sterile gloves</i></p> |
| <p>2. <a href="#">Perform hand hygiene.</a></p>           | <p>Hand hygiene prevents spread of microorganisms.</p>  <p><i>Perform hand hygiene</i></p>                   |

|  |  |
|--|--|
| <p>3. Gather necessary equipment.</p>  | <p>Dressing supplies must be for single patient use only.</p> <p>Use the smallest size of dressing for the wound.</p>  <p><i>Gather supplies</i></p> <p>Take only the dressing supplies needed for the dressing change to the bedside.</p> |
| <p>4. Prepare environment, position patient, adjust height of bed, turn on lights.</p> | <p>Ensure patient's comfort prior to and during the procedure.</p> <p>Proper lighting allows for good visibility to assess wound.</p>  |
| <p>5. <a href="#">Perform hand hygiene.</a></p>  | <p>Hand hygiene prevents spread of microorganisms.</p>  <p><i>Hand hygiene with ABHR</i></p>  |
| <p>6. Prepare sterile field.</p>   |  <p><i>Prepare sterile field</i></p>   |

|   |  |
|---|--|
| <p>7. Add necessary sterile supplies.</p>           |  <p><i>Add necessary supplies</i></p>  |
| <p>8. Pour cleansing solution.</p>                  |  <p><i>Pour sterile cleansing solution into sterile tray</i></p> <p>Normal saline or sterile water containers must be used for only one client and must be dated and discarded within at least 24 hours of being opened.</p> |
| <p>9. Prepare patient and expose dressed wound.</p> |  <p><i>Prepare patient and expose wound</i></p>  |

|  |   |
|--|---|
| <p>10. Apply non-sterile gloves.</p>   | <p>Use non-sterile gloves to protect yourself from contamination.</p>  <p><i>Apply non-sterile gloves</i></p> |
| <p>11. Remove outer dressing with non-sterile gloves and discard as per agency policy.</p> |  <p><i>Remove outer dressing with non-sterile gloves</i></p>  |
| <p>12. Remove inner dressing with transfer forceps, if necessary.</p>                      |  <p><i>Remove inner dressing with transfer forceps</i></p>  |

13. Discard transfer forceps and non-sterile gloves according to agency policy.



*Discard transfer forceps as per agency policy*



*Discard gloves*

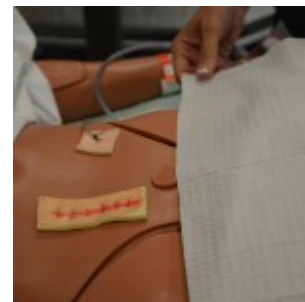
14. Assess wound.



*Assess wound*

15. Drape patient with water-resistant underpad (optional).

Water-resistant underpad protects patient's clothing and linen.



*Drape patient with water-resistant underpad*

16. Apply non-sterile gloves (optional).

Use non-sterile gloves to protect yourself from contamination.



*Apply non-sterile gloves*

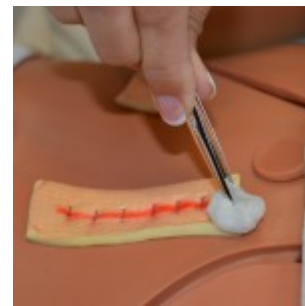
17. Cleanse wound using one 2 x 2 gauze per stroke. Strokes should be:

- From clean to dirty (incision, then outer edges)
- From top to bottom

The suture line is considered the “least contaminated” area and is cleansed first.



*1. Using a sterile swab or gauze, clean the suture line by starting at the centre and working toward one end.*



*2. With another sterile swab or gauze, start at the centre of the incision and work toward the other end.*



*3. All other cleansing involves moving from one end to the other on each side of the incision.*



*4. Work in straight lines, moving away from the suture line with each successive stroke.*

18. Cleanse around drain (if present).

If a drain is present, clean the drain site using a circular stroke, starting with the area immediately next to the drain.

Using a new swab, cleanse immediately next to the drain and attempt to clean a little further out from the drain. Continue this process with subsequent swabs until the skin surrounding the drain is cleaned.



*Cleanse around drain*

19. Apply inner dressing (4 x 4 gauze) with forceps to incision, then drain site (drain sponges/cut gauze).



1. Cover incision



2. Cover drain site





3. Tape drain tubing to skin

20. Discard non-sterile gloves if they were used.

This step prevents the spread of microorganisms.



Discard gloves

|   |   |
|---|---|
| <p>21. Apply outer dressing, keeping the inside of the sterile dressing touching the wound.</p>   | <p>This step protects wound from contamination.</p>  <p><i>Apply outer dressing if required</i></p>   |
| <p>22. To complete dressing change:</p> <ul style="list-style-type: none"> <li>• Assist patient to comfortable position.</li> <li>• Lower patient's bed.</li> <li>• Discard used equipment appropriately.</li> <li>• <a href="#">Perform hand hygiene.</a></li> </ul> | <p>Taking these step ensures the patient's continued safety.</p>  <p><i>Hand hygiene with ABHR</i></p>   |
| <p>23. Document procedure and findings according to agency policy.</p>  | <p>Record dressing change as per hospital policy.</p> <p>Document the wound appearance, if the staples are intact, if the incision is well-approximated.</p> <p>Chart the time, place of wound, size, drainage and amount, type of cleaning solution, and dressing applied.</p> <p>State how the patient tolerated the procedure.</p> <p>Report any unusual findings or concerns to the appropriate health care professional.</p> |
| <p>24. Compare wound to previous wound assessment and determine healing progress, if any.</p>   | <p>If there is no movement toward healing, or if there is deterioration, notify the physician or wound care nurse according to agency policy.</p>   |
| <p>Data source: BCIT, 2010a; Perry et al., 2014</p>   |   |

VIDEO 4.1

Watch the video [Simple Sterile Dressing Change](#) by [Renée Anderson and Wendy McKenzie](#), Thompson Rivers University.

Critical Thinking Exercises

1. Your patient has a post-operative hip incision. You notice that the wound is slightly inflamed and not approximated, with some yellowish exudate present. What would be your next steps?
2. As you select your supplies, you notice that the sterile saline container was opened exactly 24 hours ago. What would be your next steps?

---

## 4.4 Suture Removal

Sutures are tiny threads, wire, or other material used to sew body tissue and skin together. They may be placed deep in the tissue and/or superficially to close a wound. A variety of suture techniques are used to close a wound, and deciding on a specific technique depends on the location of the wound, thickness of the skin, degree of tensions, and desired cosmetic effect (Perry et al., 2014).

There are three types of sutures techniques: intermittent, blanket, and continuous (see Figure 4.2). The most commonly seen suture is the intermittent suture.

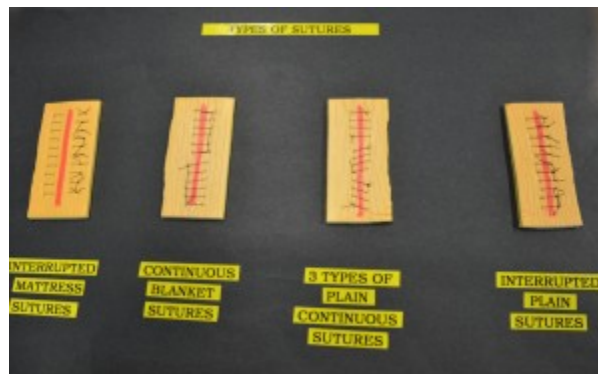


Figure 4.2 Types of sutures

Sutures may be absorbent (dissolvable) or non-absorbent (must be removed). Non-absorbent sutures are usually removed within 7 to 14 days. Suture removal is determined by how well the wound has healed and the extent of the surgery. Sutures must be left in place long enough to establish wound closure with enough strength to support internal tissues and organs.

A health care team member must assess the wound to determine whether or not to remove the sutures. The wound line must also be observed for separations during the process of suture removal. Removal of sutures must be ordered by the primary health care provider (physician or nurse practitioner). An order to remove sutures must be obtained prior to the procedure, and a comprehensive assessment of the wound site must be performed prior to the removal of the sutures by a health care team member.

Alternate sutures (every second suture) are typically removed first, and the remaining sutures are removed once adequate approximation of the skin tissue is determined. If the wound is well healed, all the sutures would be removed at the same time. Alternately, the removal of the remaining sutures may be days or weeks later (Perry et al., 2014). Checklist 34 provides the steps for intermittent suture removal.




**Checklist 34: Intermittent Suture Removal**



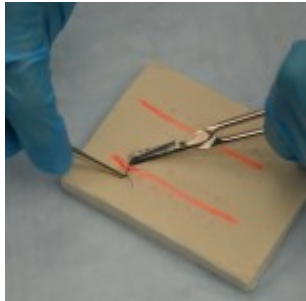
*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [additional precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Explain process to patient and offer analgesia, bathroom etc.
- Listen and attend to patient cues.
- Ensure patient's privacy and dignity.
- Assess [ABCSS/suction/oxygen/safety.](#)

| STEPS  | ADDITIONAL INFORMATION   |
|--|--|
| 1. Confirm physician/nurse practitioner (NP) orders, and explain procedure to patient. | <p>Explaining the procedure will help prevent anxiety and increase compliance with the procedure.</p> <p>Inform patient that the procedure is not painful but the patient may feel some pulling of the skin during suture removal.</p> |
| 2. Gather appropriate supplies.  | <p>You will need sterile suture scissors or suture blade, sterile dressing tray (to clean incision site prior to suture removal), non-sterile gloves, normal saline, Steri-Strips, and sterile outer dressing.</p>                     |
| 3. Position patient appropriately and create privacy for procedure.                    | <p>Ensure proper body mechanics for yourself and create a comfortable position for the patient.</p>  |
| 4. <a href="#">Perform hand hygiene.</a>   | <p>Hand hygiene reduces the risk of infection.</p> <div> </div> <p><i>Perform hand hygiene</i></p>   |

|  |   |
|--|---|
| <p>5. Prepare the sterile field and add necessary supplies in an organized manner.</p> | <p>This allows easy access to required supplies for the procedure.</p>  <p><i>Prepare sterile field</i></p>   |
| <p>6. Remove dressing and inspect the wound using non-sterile gloves.</p>              | <p>Visually assess the wound for uniform closure of the wound edges, absence of drainage, redness, and swelling.</p> <p>Pain should be minimal.</p> <p>After assessing the wound, decide if the wound is sufficiently healed to have the sutures removed. If there are concerns, question the order and seek advice from the appropriate health care provider.</p>  <p><i>Assess wound</i></p> |
| <p>7. Remove non-sterile gloves and <a href="#">perform hand hygiene</a>.</p>          | <p>This prevents the transmission of microorganisms.</p>  <p><i>Hand hygiene with ABHR</i></p>  |

|   |  |
|---|--|
| <p>8. Apply clean non-sterile gloves.</p>   | <p>This prevents the transmission of microorganisms.</p>  <p><i>Apply non-sterile gloves</i></p>   |
| <p>9. Clean incision site according to agency policy.</p>   | <p>This step reduces risk of infection from microorganisms on the wound site or surrounding skin.</p>  <p><i>Clean incision</i></p> <p>Cleaning also loosens and removes any dried blood or crusted exudate from the sutures and wound bed.</p> |
| <p>10. To remove intermittent sutures, hold scissors in dominant hand and forceps in non-dominant hand.</p> | <p>This allows for dexterity with suture removal.</p>  <p><i>Hold scissors in dominant hand and forceps in non-dominant hand</i></p>   |

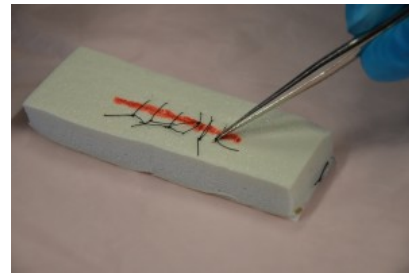
11. Place a sterile 2 x 2 gauze close to the incision site.

The sterile 2 x 2 gauze is a place to collect the removed suture pieces.



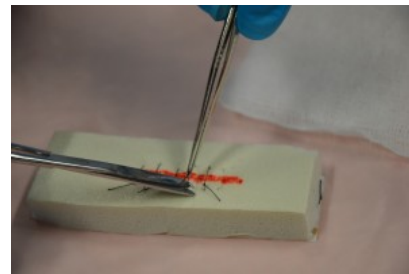
*Place sterile 2 x 2 gauze close by*

12. Grasp knot of suture with forceps and gently pull up knot while slipping the tip of the scissors under suture near the skin. Examine the knot.



*The knot should have three ends*

13. Cut under the knot as close as possible to the skin at the distal end of the knot.

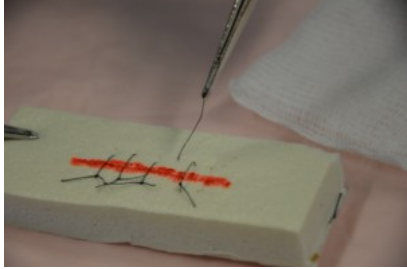





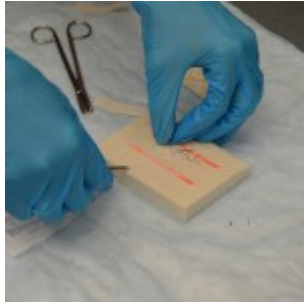
*Cut under the knot*

Never snip both ends of the knot as there will be no way to remove the suture from below the surface.

Do not pull the contaminated suture (suture on top of the skin) through tissue.

If using a blade to cut the suture, point the blade away from you and your patient.

|   |  |
|---|--|
| <p>14. Grasp knotted end with forceps, and in one continuous action pull suture out of the tissue and place cut knot on sterile 2 x 2 gauze.</p>                          |  <p><i>Grasp knotted end with forceps</i></p>  |
| <p>15. Remove every second suture until the end of the incision line.</p>   | <p>Assess wound healing after removal of each suture to determine if each remaining suture will be removed.</p>  |
| <p><b>If wound edges open, stop removing sutures, apply Steri-Strips (using tensions to pull wound edges together), and notify appropriate health care providers.</b></p> |  |
| <p>16. Using the principles of sterile technique, place Steri-Strips on location of every removed suture along incision line.</p>   |  <p><i>Apply Steri-Strips</i></p>   |
| <p>17. Cut Steri-Strips so that they extend 1.5 to 2 inches on each side of incision.</p>   | <p>Steri-Strips support wound tension across wound and help to eliminate scarring.</p>  <p><i>Steri-Strips</i></p> |

|  |   |
|--|---|
| <p>18. Remove remaining sutures on incision line if indicated.</p>                           | <p>Only remove remaining sutures if wound is well approximated.</p>  <p><i>Remove remaining sutures</i></p> |
| <p>19. Place Steri-Strips on remaining areas of each removed suture along incision line.</p> | <p>The Steri-Strips will help keep the skin edges together.</p>  <p><i>Apply Steri-Strips</i></p>           |
| <p>Data source: BCIT, 2010c; Perry et al., 2014</p>  |   |

## VIDEO 4.2

Watch the video [Intermittent Suture Removal](#) by [Renée Anderson and Wendy McKenzie](#), Thompson Rivers University.

Checklist 35 outlines the steps to remove continuous and blanket stitch sutures.




**Checklist 35: Continuous and Blanket Stitch Suture Removal**



*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

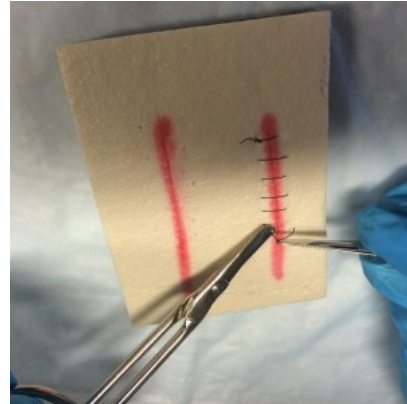
- [Perform hand hygiene.](#)
- Check room for [additional precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Explain process to patient and offer analgesia, bathroom etc.
- Listen and attend to patient cues.
- Ensure patient’s privacy and dignity.
- Assess [ABCCS/suction/oxygen/safety.](#)

| STEPS   | ADDITIONAL INFORMATION   |
|---|--|
| 1. Confirm physician/NP orders, and explain procedure to patient.   | <p>Explaining the procedure will help prevent anxiety and increase compliance with the procedure.</p> <p>Inform patient that the procedure is not painful but the patient may feel some pulling of the skin during suture removal.</p> |
| 2. Gather appropriate supplies.                                     | <p>You will need sterile suture scissors or suture blade, sterile dressing tray (to clean incision site prior to suture removal), non-sterile gloves, normal saline, Steri-Strips, and sterile outer dressing.</p>                     |
| 3. Position patient appropriately and create privacy for procedure. | <p>Ensure proper body mechanics for yourself and create a comfortable position for the patient.</p>  |
| 4. <a href="#">Perform hand hygiene.</a>                            | <p>Hand hygiene reduces the risk of infection.</p> <div> </div> <p><i>Perform hand hygiene</i></p>   |

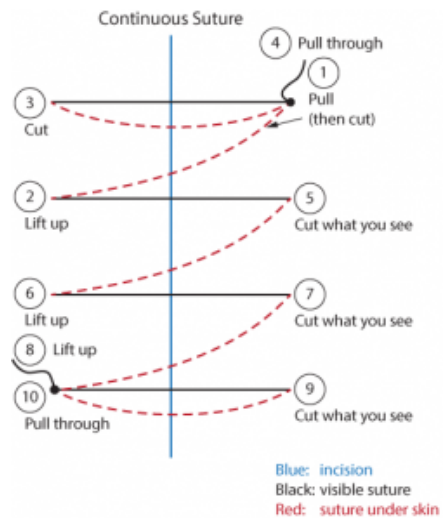
|  |   |
|--|---|
| <p>5. Prepare the sterile field and add necessary supplies in an organized manner.</p> | <p>This step allows for easy access to required supplies for the procedure.</p>  <p><i>Prepare sterile field</i></p>  |
| <p>6. Remove dressing and inspect the wound using non-sterile gloves.</p>              | <p>Visually assess the wound for uniform closure of the wound edges, absence of drainage, redness, and swelling.</p> <p>Pain should be minimal.</p>  <p><i>Assess wound</i></p> <p>After assessing the wound, decide if the wound is sufficiently healed to have the sutures removed. If there are concerns, question the order and seek advice from the appropriate health care provider.</p> |
| <p>7. Remove non-sterile gloves and <a href="#">perform hand hygiene</a>.</p>          | <p>This step prevents the transmission of microorganisms.</p>  <p><i>Remove non-sterile gloves</i></p>  |

|  |   |
|--|---|
| <p>8. Apply clean non-sterile gloves.</p>  | <p>This prevents the transmission of microorganisms.</p>  <p><i>Apply non-sterile gloves</i></p>  |
| <p>9. Clean incision site according to agency policy.</p>  | <p>This step reduces the risk of infection from microorganisms on the wound site or surrounding skin.</p> <p>Cleaning also loosens and removes any dried blood or crusted exudate from the sutures and wound bed.</p>  <p><i>Clean incision site</i></p> |
| <p>10. Place sterile gauze close to suture line; grasp scissors in dominant hand and forceps in non-dominant hand.</p> | <p>This allows for dexterity with suture removal.</p>   |

11. Snip first suture close to the skin surface, distal to the knot.



*Snip suture distal to the knot*

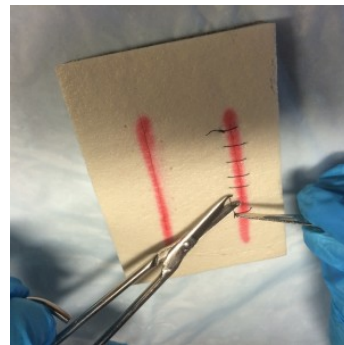


*Continuous suture removal guide*

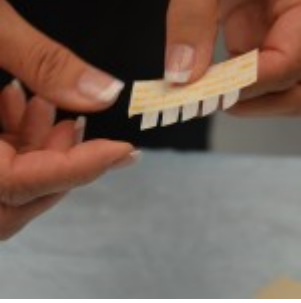

12. Snip second suture on the same side.

This action prevents the suture from being left under the skin.

13. Grasp knotted end and gently pull out suture; place suture on sterile gauze.



*Never pull contaminated suture underneath the tissue*

|  |  |
|--|--|
| 14. Continue cutting in the same manner until the entire suture is removed, inspecting the incision line during the procedure.                       | Inspection of incision line reduces the risk of separation of incision during procedure.   |
| <b>If separation occurs, stop procedure, apply Steri-Strips, and notify physician.</b>   |  |
| 15. Apply Steri-Strips to suture line, then apply sterile dressing or leave open to air.   | <p>This step reduces the risk of infection.</p>  <p><i>Apply Steri-Strips</i></p>  |
| 16. Position patient and lower bed to safe height; ensure patient is comfortable and free from pain.   | This ensures patient safety.   |
| 17. Complete patient teaching regarding Steri-Strips and bathing, wound inspection for separation of wound edges, and ways to enhance wound healing. | <p>Instruct patient to take showers rather than bathe.</p> <p>Instruct patient to pat dry, and to not scrub or rub the incision.</p> <p>Instruct patient not to pull off Steri-Strips. Allow the Steri-Strips to fall off naturally and gradually (usually takes one to three weeks).</p> <p>Instruct patient about the importance of not straining during defecation, and the importance of adequate rest, fluids, nutrition, and ambulation for optimal wound healing.</p> |
| 18. Discard supplies according to agency policies for sharp disposal and biohazard waste.  | Scissors and forceps may be disposed of or sent for sterilization.   |
| 19. <a href="#">Perform hand hygiene.</a>  | <p>Hand hygiene reduces risk of infection.</p>  <p><i>Hand hygiene with ABHR</i></p>   |
| 20. Document procedures and findings according to agency policy.   | Report any unusual findings or concerns to the appropriate health care professional.   |

Data source: BCIT, 2010c; Perry et al., 2014

### VIDEO 4.3

Watch the video [Continuous and Blanket Stitch Suture Removal](#) by [Renée Anderson and Wendy McKenzie](#), Thompson Rivers.

Complications related to suture removal, including wound dehiscence, may occur if wound is not well healed, if the sutures are removed too early, or if excessive force (pressure) is applied to the wound. In addition, if the sutures are left in for an extended period of time, the wound may heal around the sutures, making extraction of the sutures difficult and painful. Table 4.4. lists additional complications related to wounds closed with sutures.

**Table 4.4 Complications of Suture Removal**

| <b>Complication</b>   | <b>Solution</b>  |
|---|--|
| Unable to remove suture from tissue   | Contact physician for further instructions.  |
| Wound dehiscence:<br>Incision edges separate during suture removal;<br>wound opens up | Stop removing sutures.<br>Apply Steri-Strips across open area.<br>Notify physician.  |
| Patient experiences pain when sutures are removed                                     | Allow small breaks during removal of sutures.<br>Provide opportunity for the patient to deep breathe and relax during the procedure.   |
| Wound becomes red, painful, with increasing pain, fever, drainage from wound          | These changes may indicate the wound is infected. Report findings to the primary health care provider for additional treatment and assessments.  |
| Scarring related to sutures   | All wounds form a scar and will take months to one year to completely heal. Scarring may be more prominent if sutures are left in too long.  |
| Keloid formation  | A <b>keloid formation</b> is a firm scar-like mass of tissue that occurs at the wound site. The scarring tends to extend past the wound and is darker in appearance.   |
| Hypertrophic scars  | Hypertrophic scars are scars that are bulky but remain within the boundaries of the wound. These scars can be minimized by applying firm pressure to the wound during the healing process using sterile Steri-Strips or a dry sterile bandage. |

Data source: BCIT, 2010c; Perry et al., 2014

### Critical Thinking Exercises

1. What is the purpose of applying Steri-Strips to the incision after removing sutures?
2. Which health care provider is responsible for assessing the wound prior to removing sutures?

---

## 4.5 Staple Removal

Staples are made of stainless steel wire and provide strength for wound closure. The wound location sometimes restricts their use because the staples must be far enough away from organs and structures. The aesthetic outcome may not be as desirable as a suture line, but staples are strong, quick to insert, and simple to remove.

Removal of staples requires sterile technique and a staple extractor. An order to remove the staples, and any specific directions for removal, must be obtained prior to the procedure. The health care professional performing the removal must also inspect the wound prior to the procedure to ensure the wound is adequately healed to have the staples removed. Usually every second staple is removed initially; then the remainder are removed at a later time (Perry et al., 2014). In general, staples are removed within 7 to 14 days.

Checklist 36 outlines the steps for removing staples from a wound.

### Checklist 36: Staple Removal

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [additional precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Explain process to patient and offer analgesia, bathroom, etc.
- Listen and attend to patient cues.
- Ensure patient’s privacy and dignity.
- Assess [ABCSS/suction/oxygen/safety.](#)

| STEPS   | ADDITIONAL INFORMATION  |
|---|---|
| 1. Confirm physician orders, and explain procedure to patient.      | Explanation helps prevent anxiety and increases compliance with the procedure. Inform patient the procedure is not painful but the patient may feel some pulling or pinching of the skin during staple removal. |
| 2. Gather appropriate supplies.                                     | Gather sterile staple extractors, sterile dressing tray, non-sterile gloves, normal saline, Steri-Strips, and sterile outer dressing.   |
| 3. Position patient appropriately and create privacy for procedure. | Ensure proper body mechanics for yourself and create a comfortable position for the patient.  |
| 4. <a href="#">Perform hand hygiene.</a>                            | <p>This reduces the risk of infection.</p> <div> </div> <p><i>Perform hand hygiene</i></p>  |

5. Prepare the sterile field and add necessary supplies (staple extractor).

This step allows easy access to required supplies for the procedure.



*Add sterile items to sterile field*

6. Remove dressing and inspect the wound.

Visually assess the wound for uniform closure of the edges, absence of drainage, redness, and inflammation.

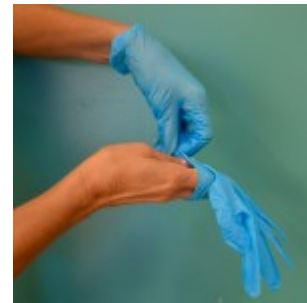


*Remove dressing and inspect the wound*



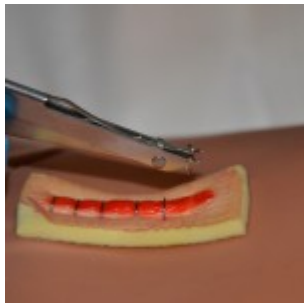
After assessing the wound, determine if the wound is sufficiently healed to have the staples removed. If concerns are present, question the order and seek advice from the appropriate health care provider.


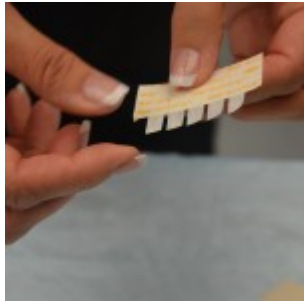
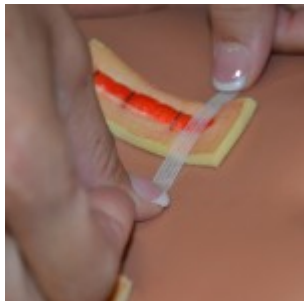
7. Apply non-sterile gloves.



This reduces the risk of contamination.



*Apply non-sterile gloves*

|   |  |
|---|--|
| <p>8. Clean incision site according to agency policy.</p>   | <p>This reduces the risk of infection from microorganisms on the wound site or surrounding skin.</p>  <p><i>Clean incision site</i></p> <p>Cleaning also loosens and removes any dried blood or crusted exudate from the staples and wound bed.</p>  |
| <p><b>To Remove Staples (start with every second staple).</b></p>   |  |
| <p>9. Place lower tip of staple extractor beneath the staple. Do not pull up while depressing handle on staple remover or change the angle of your wrist or hand. Close the handle, then gently move the staple side to side to remove.</p> | <p>The closed handle depresses the middle of the staple causing the two ends to bend outward and out of the top layer of skin.</p>  <p><i>Close the handle, then gently move the staple from side to side to remove</i></p>                         |
| <p>10. When both ends of the staple are visible, move the staple extractor away from the skin and place the staple on a sterile piece of gauze by releasing the handles on the staple extractor.</p>  | <p>This avoids pulling the staple out prematurely and avoids putting pressure on the wound. It also prevents scratching the skin with the sharp staple.</p>  <p><i>Keep the handle closed and move the staple extractor away from the skin</i></p> |

|   |  |
|---|--|
| <p>11. Continue to remove every second staple to the end of the incision line.</p>  | <p>Alternating removal of staples provides strength to incision line while removing staples and prevents accidental separation of incision line.</p>  <p><i>Continue to remove every second staple to the end of the incision line</i></p>   |
| <p>12. Using the principles of sterile technique, place Steri-Strips on location of every removed staple along incision line.</p> | <p>Cut Steri-Strips to allow them to extend 1.5 to 2 cm on each side of incision.</p> <p>Remove sterile backing to apply Steri-Strips.</p>  <p><i>Cut Steri-Strips</i></p> <p>Steri-Strips support wound tension across wound and eliminate scarring.</p> <p>This allows wound to heal by primary intention.</p>  <p><i>Cut Steri-Strips to allow them to extend 1.5 to 2 cm on each side of incision</i></p> |
| <p>13. Remove remaining staples, followed by applying Steri-Strips along the incision line.</p>                                   | <p>Steri-Strips support wound tension across wound and eliminate scarring.</p>   |

|  |   |
|--|---|
| <p>14. Apply dry, sterile dressing on incision site or leave exposed to air if wound is not irritated by clothing, or according to physician orders.</p>   | <p>This reduces risk of infection.</p>  <p><i>Apply dry, sterile dressing if required</i></p>   |
| <p>15. Position patient, lower bed to safe height, and ensure patient is comfortable and free from pain.</p>   | <p>This provides patient with a safe, comfortable place, and attends to pain needs as required.</p>   |
| <p>16. Complete patient teaching regarding Steri-Strips and bathing, wound inspection for separation of wound edges, and ways to enhance wound healing.</p>  | <p>Instruct patient to take showers rather than bathe.</p> <p>Instruct patient not to pull off Steri-Strips and to allow them to fall off naturally and gradually (usually takes one to three weeks).</p> <p>Instruct on the importance of not straining during defecation, and of adequate rest, fluids, nutrition, and ambulation for optional wound healing.</p> |
| <p>17. Discard supplies according to agency policies for sharp disposal and biohazard waste.</p>   | <p>Staple extractor may be disposed of or sent for sterilization.</p>   |
| <p>18. <a href="#">Perform hand hygiene</a> and document procedure and findings according to agency policy. Report any unusual findings or concerns to the appropriate health care professional.</p> | <p>Hand hygiene reduces the risk of infection.</p>  <p><i>Hand hygiene with ABHR</i></p>  |
| <p>Data source: BCIT, 2010c; Perry et al., 2014</p>  |   |

VIDEO 4.4

Watch the video [Staple Removal](#) by [Renée Anderson and Wendy McKenzie](#), Thompson Rivers University.

*Special Considerations:*

- Confirm physician order to remove all staples or every second staple. All wounds held together with staples require an assessment to ensure the wound is sufficiently healed to remove the staples.

Staple removal may lead to complications for the patient. When removing staples, consider the length of time the staples have been in situ. **Wound dehiscence**, a mechanical failure of wound healing, remains a problem and can be affected by multiple factors (Spiliotis et al., 2009). Obese patients (greater than 30 kg/m<sup>2</sup>) have a higher risk of dehiscence than patients with a normal BMI. Additional risk factors for dehiscence include age over 75 years, COPD, diagnosis of cancer, use of steroids, malnutrition, anemia, sepsis, obesity, diabetes, tobacco use, and previous administration of chemotherapy or radiotherapy (Spiliotis et al., 2009). Table 4.5 lists other complications of removing staples.

**Table 4.5 Complications of Staple Removal**

| Complication  | Solution   |
|---|--|
| Unable to remove staple from tissue                       | Contact physician for further instructions.  |
| Dehiscence: Incision edges separate during staple removal | Stop removing staples.<br>Apply Steri-Strips across open area.<br>Notify physician.  |
| Patient experiences pain when staples are removed         | Allow small breaks during removal of staples.<br>Provide opportunity for the patient to deep breathe and relax during the procedure. |
| Data source: BCIT, 2010c; Perry et al., 2014              |  |

## Critical Thinking Exercises

1. You are about to remove your patient's abdominal incision staples according to the physician's orders. As you start to remove the staples, you notice that the skin edges of the incision line are separating. What would be your next steps?
2. Your patient informs you that he is feeling significant pain as you begin to remove his staples. What would you do next?



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## 4.6 Moist to Dry Dressing, and Wound Irrigation and Packing

### MOIST TO DRY DRESSING

A moist to dry dressing is a primary dressing that directly touches the wound bed, with a secondary dressing that covers the primary dressing. The type of wound dressing used depends not only on the characteristics of the wound but also on the goal of the wound treatment.

**Important:** Ensure pain is well managed prior to a dressing change to maximize patient comfort.


Checklist 37 outlines the steps for performing a moist to dry dressing change.





### Checklist 37: Moist to Dry Dressing Change

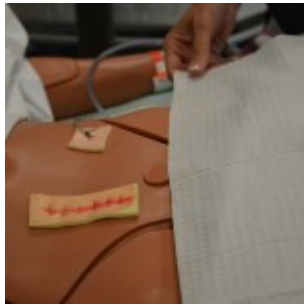


*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*





*Safety considerations:*


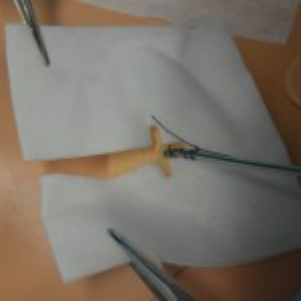

- Check room for [additional precautions](#).
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Explain process to patient and offer analgesia, bathroom, etc.
- Listen and attend to patient cues.
- Ensure patient’s privacy and dignity.
- Assess [ABCSS/suction/oxygen/safety](#).

| STEPS   | ADDITIONAL INFORMATION  |
|---|---|
| 1. Check present dressing using non-sterile gloves.                             | This provides an opportunity to collect required supplies for the procedure.  |
| 2. <a href="#">Perform hand hygiene</a> .                                       | Hand hygiene reduces the risk of infection.<br><br><br><i>Perform hand hygiene</i> |
| 3. Gather necessary equipment and supplies.                                     | Being organized will help with efficiency and expedite the procedure, minimizing the length of time the patient experiences discomfort.                               |
| 4. Prepare environment, position patient, adjust height of bed, turn on lights. | This helps prepare patient and bedside for procedure.   |

|   |  |
|---|--|
| <p>5. <a href="#">Perform hand hygiene.</a></p> | <p>Hand hygiene reduces the risk of infection.</p>  <p><i>Hand hygiene with ABHR</i></p> |
| <p>6. Prepare sterile field.</p>                |  <p><i>Sterile field</i></p>   |
| <p>7. Add necessary sterile supplies.</p>       |  <p><i>Add supplies</i></p>  |
| <p>8. Pour cleansing solution.</p>              |  <p><i>Pour cleansing solution</i></p>   |

|   |   |
|---|---|
| <p>9. Expose dressed wound.</p>                           | <p>Inspect wound for the amount of drainage, odours, and type of drainage.</p>  <p><i>Inspect the wound</i></p>   |
| <p>10. Apply non-sterile gloves.</p>                      | <p>This reduces the risk of contaminating your hands with the patient's blood and other body fluids.</p> <p>It also reduces the risk of germ dissemination to the environment and of germ transmission from you to the patient and vice versa, as well as from one patient to another.</p>  <p><i>Apply non-sterile gloves</i></p> |
| <p>11. Remove outer dressing with non-sterile gloves.</p> |  <p><i>Remove outer dressing with non-sterile gloves</i></p>  |

|   |  |
|---|--|
| <p>12. Remove inner dressing with transfer forceps.</p>   |  <p><i>Remove inner dressing with forceps</i></p>  |
| <p>13. Discard transfer forceps and non-sterile gloves.</p>   |  <p><i>Discard transfer forceps</i></p>  |
| <p>14. Drape patient with underpad (optional).</p>  |  <p><i>Drape patient with underpad</i></p>   |
| <p>15. Apply non-sterile gloves (optional).</p>   | <p>This reduces the risk of infection.</p>   |
| <p>16. Place sterile or non-woven gauze in container of prescribed solution, and wring out excess solution.</p> | <p>Use enough prescribed solution to saturate gauze. Excess solution has the potential to contaminate surrounding areas.</p>  <p><i>Saturate gauze</i></p> |

|   |   |
|---|---|
| <p>17. Apply moist gauze as a single layer onto wound surface, pack gauze into wound if necessary, and ensure gauze does not touch skin around the wound.</p> | <p>Apply skin preparation as per agency protocol, if required.</p>  <p><i>Apply moist gauze</i></p> |
| <p>18. Cleanse around drain (if present).</p>   | <p>Drain is cleansed using circular strokes starting near the drain and moving outward and away from the insertion site.</p>  |
| <p>19. Apply dry layer of sterile gauze over moist gauze using sterile technique.</p>   | <p>This covers moist gauze and preserves moistness.</p>   |
| <p>20. Apply drain sponges/cut gauze to drain site if present.</p>  |  <p><i>Apply drain sponges/cut gauze to drain site if present</i></p>                              |
| <p>21. Cover with ABD (abdominal) pad or gauze, and fasten with tape.</p>   |   |
| <p>22. Discard non-sterile gloves according to agency policy and <a href="#">perform hand hygiene</a>.</p>  | <p>Hand hygiene reduces the risk of infection.</p>  <p><i>Discard gloves</i></p>                  |

|  |  |
|--|--|
| <p>23. Next:</p> <ul style="list-style-type: none"> <li>• Assist patient to comfortable position</li> <li>• Lower patient's bed</li> <li>• Discard used equipment appropriately</li> </ul> | <p>These steps ensure the patient's continued safety.</p>  |
| <p>24. Document procedure and findings according to agency policy.</p> <p>Report any unusual findings or concerns to the appropriate health care professional.</p>                         | <p>Record dressing change: time, place of wound, wound characteristics, presence of staples or sutures, size, drainage type and amount, type of cleansing solution and dressing applied.</p> |
| <p>Data source: Perry et al., 2014; WHO, 2009</p>  |  |

## WOUND IRRIGATION AND PACKING

Wound irrigation and packing refer to the application of fluid to a wound to remove exudate, slough, necrotic debris, bacterial contaminants, and dressing residue without adversely impacting cellular activity vital to the wound healing process (British Columbia Provincial Nursing Skin and Wound Committee, 2014).

Any wound that has a cavity, undermining, sinus, or a tract will require irrigation and packing. Open wounds require a specific environment for optimal healing from secondary intention. The purpose of irrigating and packing a wound is to remove debris and exudate from the wound and encourage the growth of granulation tissue to prevent premature closure and abscess formation (Saskatoon Health Region, 2013). Depending on the severity of the wound, it can take weeks to months or years to complete the healing process. Packing should only be done by a trained health care professional and according to agency guidelines.

Contraindications to packing a wound include a fistula tract, a wound with an unknown endpoint to tunnelling, a wound sinus tract or tunnel where irrigation solution cannot be retrieved, or a non-healing wound that requires a dry environment (Saskatoon Health Region, 2013).

The type of packing for the wound is based on a wound assessment, goal for the wound, and wound care management objectives. The packing material should fill the dead space and conform to the cavity to the base and sides. It is important to not over-pack or under-pack the wound. If the wound is over-packed, there may be excessive pressure placed on the tissue causing pain, impaired blood flow, and, potentially, tissue damage. If the wound is under-packed and the packing material is not touching the base and the sides of the cavity, undermining, sinus tract, or tunnel, there is a risk of the edges rolling and abscess formation (British Columbia Provincial Nursing Skin and Wound Committee, 2014).

The types of gauze used to pack a wound may be soaked with normal saline, ointment, or hydrogel, depending on the needs of the wound. Other types of packing material include impregnated gauze, ribbon dressing, hydro-fiber dressing, alginate antimicrobial dressing, and a negative pressure foam or gauze dressing. If using ribbon gauze from a multi-use container, ensure each patient has their own container to avoid cross-contamination (British Columbia Provincial Nursing Skin and Wound Committee, 2014). Additional guidelines to irrigating and packing a wound are listed in Table 4.6.

**Table 4.6: General Guidelines for Irrigating and Packing a Wound**

| <b>Guideline</b>   | <b>Additional Information</b>   |
|--|---|
| Aseptic technique  | Sterile technique or no-touch technique may be used for irrigating and packing a wound. The use of a specific technique is based on agency policy, condition of the client, healability of the wound, invasiveness, and goal of the wound care. Sterile technique or no-touch technique must be used in all acute care settings. Clean technique may be used for chronic wounds in long-term-care settings.   |
| Type of solution for irrigation  | The most common solution used is normal saline at room temperature, unless otherwise ordered. Check physician orders.   |
| Wound irrigation   | The wound is irrigated each time the dressing is changed.   |
| Irrigation pressure  | The pressure of irrigating must be strong enough to remove debris but not damage the new tissue. Generally, a 35 ml syringe with a 19 gauge blunt tip is sufficient for irrigation.   |
| Wound assessment   | Wound assessment must be done with each dressing change to ensure the product is adequately meeting the needs of the wound.   |
| Swabbing the wound   | Swab for culture, if required. always swab a wound after irrigation.  |
| Packing material   | <p>Packing material must be removed with each dressing change. Only one piece of gauze or dressing material should be used in wounds with sinus tracts or tunnelling to avoid the risk of retaining dressing/packing material. If there is a concern that packing is retained in the wound, contact the wound specialist or physician for follow-up.</p> <p>Always leave a “tail” of the packing strip outside the wound. If more than one piece of packing is used, leave the tails outside the wound by securing the tails to the skin with a piece of Steri-Strip.</p> |
| Documentation  | Wound assessment and dressing change must be documented each time. Each wound requires a separate wound care sheet. Type and quantity of packing material (length or pieces), along with the number of inner and outer dressings should be recorded as per agency policy. For any cavity, undermining, sinus tract, or tunnel with a depth greater than 1cm (>1cm), count and document the number of packing pieces removed from the wound, and the number of packing pieces inserted into the wound.   |
| Communication  | A copy of the most recent wound care assessment and dressing change should be sent with patient upon transfer to another health care facility.  |
| Use of sterile gloves for packing  | Sterile gloves may be used if packing a large or complex wound.   |
| Data source: British Columbia Provincial Nursing Skin and Wound Committee, 2014; Saskatoon Health Region, 2013 |   |

The health care professional chooses the method of cleansing (a squeezable sterile normal saline container or a 30 to 35 cc syringe with a wound irrigation tip catheter) and the type of wound cleansing

solution to be used based on the presence of undermining, sinus tracts or tunnels, necrotic slough, and local wound infection.

Agency policy will determine the wound cleansing solution, but sterile normal saline and sterile water are the solutions of choice for cleansing wounds and should be warmed to support wound healing.

Undermining, sinuses, and tunnels can only be irrigated when there is a known endpoint. Do not irrigate undermining, sinuses, or tunnels that extend beyond 15 cm unless directed by a physician or nurse practitioner (NP). If fluid is instilled into a sinus, tunnel, or undermined area and cannot be removed from the area, stop irrigating and refer to a wound specialist or physician or NP.


Checklist 38 outlines the steps for irrigating and packing a wound.



**Checklist 38: Wound Irrigation and Packing**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [additional precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Explain process to patient and offer analgesia, bathroom, etc.
- Listen and attend to patient cues.
- Ensure patient’s privacy and dignity.
- Assess [ABCCS/suction/oxygen/safety.](#)
- Containers with cleansing solution must be patient specific and must be discarded after 24 hours if solution is left over.

| STEPS   | ADDITIONAL INFORMATION   |
|---|--|
| 1. Review order for wound irrigation and packing. | Confirm that physician’s orders are appropriate to wound assessment.   |
| 2. <a href="#">Perform hand hygiene.</a>          | <p>Hand hygiene reduces the risk of infection.</p>  <p><i>Hand hygiene with ABHR</i></p> |

|  |   |
|--|---|
| <p>3. Gather necessary equipment and supplies:</p> <ul style="list-style-type: none"> <li>• Syringe</li> <li>• Cannula with needleless adaptor</li> <li>• Irrigation fluid</li> <li>• Basin</li> <li>• Waterproof pad</li> <li>• Dressing tray with sterile forceps</li> <li>• Steri-Strips</li> <li>• Scissors</li> <li>• Skin barrier/protectant</li> <li>• Cotton tip applicators</li> <li>• Measuring guide</li> <li>• Outer sterile dressing</li> <li>• Packing gauze or packing as per physician's orders</li> </ul> <p>Some agencies provide a prepackaged sterile irrigation tray.</p> | <p>Being organized will help with efficiency and expedite the procedure, minimizing the length of time the patient experiences discomfort.</p>  <p><i>Gather supplies and set up sterile tray</i></p> |
| <p>4. Position patient to allow solution to flow off patient.</p> <p>Position patient so wound is vertical to the collection basin.</p>  |  <p><i>Position patient on side</i></p>  |
| <p>5. Place waterproof pad under patient.</p> <p>Apply clean gloves.</p> <p>Set up sterile field and supplies.</p>   | <p>Protect patient's clothing and bedding from irrigation fluid.</p>  |

6. Remove outer dressing.

- Using sterile forceps, remove inner dressing (packing) from the wound.
- If the packing sticks, gently soak the packing with normal saline or sterile water and gently lift off the packing.
- Confirm the quantity and type of packing is the same as recorded on previous dressing change.

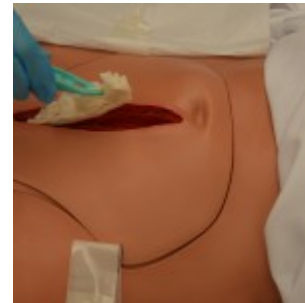


*Remove outer dressing*

Removing packing that adheres to the wound bed without soaking can cause trauma to the wound bed tissue.




If packing material cannot be removed, contact the physician / NP or wound clinician.




If packing adheres to the wound, reassess the amount of wound exudate and consider a different packing material.



*Remove inner dressing*

All packing must be removed with each dressing change.

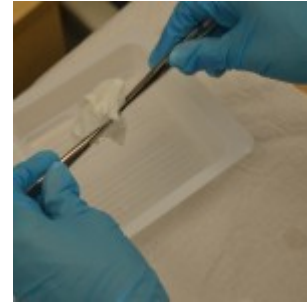
|   |   |
|---|---|
| <p>7. Assess the wound.</p> <ul style="list-style-type: none"><li>• Take measurements, including length, width, and depth.</li><li>• For undermining or tunnelling, note location and size.</li><li>• Look for evidence of bone or tendon exposure.</li><li>• Assess appearance of wound bed, noting percentage of tissue types.</li><li>• Note presence of odour after cleansing.</li><li>• Assess appearance of wound edge and peri-wound skin.</li></ul> |  <p><i>Assess the wound</i></p> <p>Wound assessment helps identify if the wound care is effective.</p> <p>Always compare the current wound assessment with the previous assessment to determine if the wound is healing, delayed, worsening, or showing signs of infection.</p> |
| <p>8. Apply non-sterile gloves, gown, and goggles or face shield according to agency policy.</p>  | <p>The use of <a href="#">personal protective equipment</a> (PPE) reduces the risk of contamination.</p>  <p><i>Apply non-sterile gloves</i></p>   |
| <p>9. Fill 35 to 60 ml syringe with sterile water/irrigating solution and attach a needleless cannula to end of syringe.</p>  |  <p><i>Fill syringe with irrigating solution</i></p>  |

|   |  |
|---|--|
| <p>10. Hold syringe about 1 inch above wound and flush wound using gently continuous pressure until returns run clear into the basin.</p> <p>If irrigating a deep wound with a very small opening, attach a small needleless catheter to prefilled irrigation syringe and insert about 1/2 inch.</p> <p>Use slow continuous pressure to flush wound.</p> <p>Repeat flushing procedure until returns run clear into the basin.</p> |  <p><i>Irrigate wound</i></p> <p>Irrigation should be drained into basin. Retained irrigation fluid is a medium for bacterial growth and subsequent infection.</p> <p>Irrigation should not increase patient discomfort.</p> <p>The irrigation tip controls the pressure of the fluid, not the force of the plunger.</p> |
| <p>11. Dry wound edges with sterile gauze using sterile forceps.</p>  |  <p><i>Dry wound edges with sterile gauze</i></p> <p>This step prevents maceration of surrounding tissue from excess moisture.</p>  |
| <p>12. Remove goggles or face shield.</p>   | <p>PPE is no longer required after irrigating a wound.</p>   |
| <p>13. <a href="#">Perform hand hygiene</a> and apply sterile gloves (if not using sterile forceps) or non-sterile gloves.</p>  | <p>Hand hygiene reduces the risk of infection.</p>  <p><i>Hand hygiene with ABHR</i></p>   |
| <p>14. Apply a skin barrier / protectant on the peri-wound skin as needed.</p>  | <p>Saturated packing materials and/or wound exudate may macerate or irritate unprotected peri-wound skin.</p>  |

## 15. For normal saline gauze packing:

- Moisten the gauze with sterile normal saline and wring it out so it is damp but not wet.
- Enclose any non-woven edges in the centre of the packing material to reduce the risk of loose threads in the wound.
- For other packing materials, see the specific product information.

The wound must be moist, not wet, for optimal healing. Gauze packing that is too wet can cause tissue maceration and reduces the absorbency of the gauze.

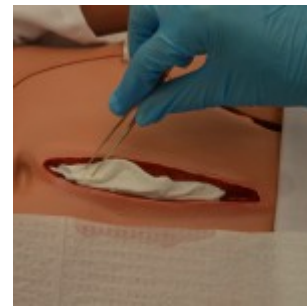


*Moisten gauze*

Normal saline gauze packing needs to be changed at least once daily.

If it is necessary to use more than one ribbon packing piece, the pieces must be tied together using sterile gloves; ensure the knot(s) is secure.

Ensure the wound is not over-packed or under-packed as this may diminish the healing process.



*Apply packing to wound*

This prepares the wound bed for optimal healing with a moist to dry dressing.

16. Open gauze and gently pack it into wound using either forceps or the tip of a cotton swab stick.

Continue until all wound surfaces are in contact with gauze.



*Apply packing to wound*

Do not pack too tightly.

Do not overlap wound edges with wet packing.

17. Always leave a “tail” of packing materials either clearly visible in the wound cavity or on the peri-wound skin.

Use a Steri-Strip to secure the packing tail to the peri-wound skin.

If two or more packing pieces have been knotted together, ensure that the knots are placed in the wound cavity, not in the undermining, sinus tract, or tunnel.



*Leave a “tail” of packing materials*

If the knot is visible in the wound, it is less likely that a packing piece will be lost if the knot comes undone.


A knot exerting pressure on the wound surface may impair blood flow and potentially cause necrosis in the wound.

18. Apply an appropriate outer dry dressing, depending on the frequency of the dressing changes and the amount of exudate from the wound.

The dressing on the wound must remain dry on the outside until the next dressing change to avoid cross-contamination of the wound.



*Apply outer dressing*

|  |   |
|--|---|
| <p>19. Discard supplies and <a href="#">perform hand hygiene</a>.</p>  | <p>This prevents the transfer of microorganisms.</p>  <p><i>Perform hand hygiene</i></p>          |
| <p>20. Help patient back into a comfortable position, and lower the bed.</p>   | <p>This step optimizes patient safety.</p>  |
| <p>21. Document wound assessment, irrigation solution, and patient response to the irrigation and dressing change.</p> <p>Documentation should include date and time of procedure.</p> <p>Report any unusual findings or concerns to the appropriate health care professional.</p> | <p>This allows for effective communication between health care providers.</p> <p>Notify required health care providers if wound appears infected or is not healing as expected.</p> |
| <p>Data source: BCIT, 2010b; Perry et al., 2014</p>  |   |

#### VIDEO 4.5

Watch the video [Wound Irrigation and Packing](#) by Renée Anderson and Wendy McKenzie, Thompson Rivers University.

The following links provide additional information about wound packing and wound measuring.

[Read this Procedure: Wound Packing PDF](#) to learn more about wound packing procedure.

[Take this Wound Assessment course](#) to learn more about wound measuring and assessment.

### Critical Thinking Exercises

1. What information is documented when a wet to dry dressing change is performed?
2. What temperature should the wound cleansing solution be?

---

## 4.7 Drain Management and Removal

### DRAIN MANAGEMENT

Drains systems are a common feature of post-operative surgical management and are used to remove drainage from a wound bed to prevent infection and the delay of wound healing. A drain may be superficial to the skin or deep in an organ, duct, or a cavity such as a hematoma. The number of drains depends on the extent and type of surgery. A closed system uses a vacuum system to withdraw fluids and collects the drainage into a reservoir. Closed systems must be emptied and measured at least once every shift and cleaned using sterile technique according to agency protocol.

Drainage tubes consist of silastic tubes with perforations to allow fluid to drain from the surgical wound site, or separate puncture holes close to the surgical area. The drainage is collected in a closed sterile collection system/reservoir (Hemovac or Jackson-Pratt) or an open system that deposits the drainage on a sterile dressing. Drainage may vary depending on location and type of surgery. A Hemovac drain (see Figure 4.3) can hold up to 500 ml of drainage. A Jackson-Pratt (JP) drain (see Figure 4.4) is usually used for smaller amounts of drainage (25 to 50 ml). Drains are usually sutured to the skin to prevent accidental removal. The drainage site is covered with a sterile dressing and should be checked periodically to ensure the drain is functioning effectively and that no leaking is occurring.

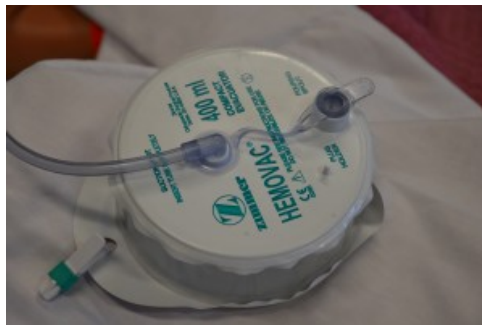


Figure 4.3 Hemovac drain



Figure 4.4 Jackson-Pratt drain


Checklist 39 outlines the steps to take when emptying a closed wound drainage system.



### Checklist 39: Emptying a Closed Wound Drainage System

DISCLAIMER: ALWAYS REVIEW AND FOLLOW YOUR HOSPITAL POLICY REGARDING THIS SPECIFIC SKILL.

*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [additional precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Explain process to patient and offer analgesia, bathroom etc.
- Listen and attend to patient cues.
- Ensure patient’s privacy and dignity.

| STEPS   | ADDITIONAL INFORMATION   |
|---|--|
| <p>1. <a href="#">Perform hand hygiene.</a></p> | <p>Hand hygiene reduces the risk of infection.</p>  <p><i>Perform hand hygiene</i></p> |
| <p>2. Collect the necessary supplies.</p>       | <p>For example: drainage measurement container, non-sterile gloves, waterproof pad, and alcohol swab</p>   |

|  |  |
|--|--|
| <p>3. Apply non-sterile gloves and goggles or face shield according to agency protocols.</p>                 | <p>Personal protective equipment reduces the transmission of microorganisms and protects against an accidental body fluid exposure.</p>  <p><i>Apply non-sterile gloves</i></p>  |
| <p>4. Maintaining sterile technique, remove plug from pouring spout as indicated on drain.</p>               | <p>Open plug pointing away from your face to avoid an accidental splash of contaminated fluid.</p> <p>Maintain the plug's sterility.</p> <p>The vacuum will be broken and the reservoir (drainage collection system) will expand.</p>  <p><i>Open drain with opening facing away from you</i></p> |
| <p>5. Gently tilt the opening of the reservoir toward the measuring container and pour out the drainage.</p> | <p>Pour away from yourself to prevent exposure to body fluids.</p>   |

6. Place drainage container on bed or hard surface, tilt away from your face, and compress the drain to flatten it with one hand.

With the other hand, swab the surface of the port, then insert the plug to close the drainage system.


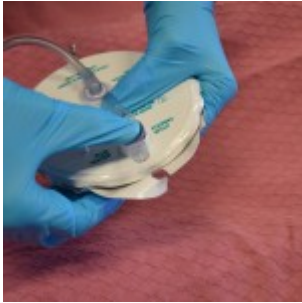
Gently squeezing the drain to flatten and remove all the air prior to closing the spout will establish the vacuum system.





*Expel air from JP drain and flatten it before closing*



*Expel air from Hemovac drain and flatten it before closing*

|   |  |
|---|--|
| <p>7. Place the plug back into the pour spout of the drainage system, maintaining sterility.</p>  | <p>This establishes vacuum suction for drainage system.</p>  <p><i>Place the plug back into the pour spout of the JP drain, maintaining sterility</i></p>  <p><i>Place the plug back into the pour spout of the Hemovac drain, maintaining sterility</i></p> |
| <p>8. Secure device onto patient's gown using a safety pin; check patency and placement of tube.</p> <p>Ensure that enough slack is present in tubing, and that reservoir hangs lower than the wound.</p> | <p>Proper placement of the reservoir allows gravity to facilitate wound drainage. Providing enough slack to accommodate patient movement prevents tension of the drainage system and pulling on the tubing and insertion site.</p>   |
| <p>9. Note character of drainage: colour, consistency, odour, amount.</p> <p>Discard drainage according to agency policy.</p>   | <p>Drainage counts as patient fluid output and must be documented on patient chart as per hospital protocol.</p> <p>Monitor drains frequently in the post-operative period to reduce the weight of the reservoir and to monitor drainage.</p>  |

|  |   |
|--|---|
| <p>10. Remove gloves and <a href="#">perform hand hygiene</a>.</p>   | <p>Hand hygiene must be performed after removing gloves. Gloves are not puncture-proof or leak-proof, and hands may become contaminated when gloves are removed.</p>  <p><i>Remove gloves</i></p>  <p><i>Hand hygiene with ABHR</i></p> |
| <p>11. Document procedure and findings according to agency policy.</p> <p>Report any unusual findings or concerns to the appropriate health care professional.</p> | <p>This allows for an accurate recording of drainage.</p> <p>Record the number the drains if there is more than one, and record each one separately.</p> <p>If the amount of drainage increases or changes, notify the appropriate health care provider according to agency policy.</p> <p>If amount of drainage significantly decreases, the drain may be ready to be assessed and removed.</p>            |
| <p>Data source: BCIT, 2010b; Perry et al., 2014</p>  |   |

## DRAIN REMOVAL

Removal of a drain must be ordered by the physician or NP. A drain is usually in place for 24 to 48 hours, and removal depends on the amount of drainage over the last 24 hours.

Checklist 40 outlines the steps for removing a wound drainage system.




**Checklist 40: Drain Removal**



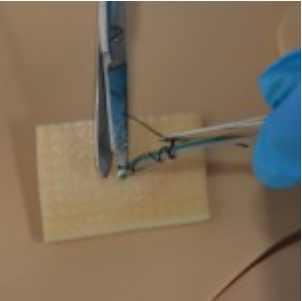
*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

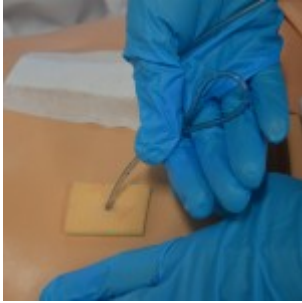


*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [additional precautions.](#)
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Explain process to patient and offer analgesia, bathroom, etc.
- Listen and attend to patient cues.
- Ensure patient's privacy and dignity.
- Assess [ABCSS/suction/oxygen/safety.](#)


| STEPS   | ADDITIONAL INFORMATION   |
|---|--|
| 1. Confirm that the physician order correlates with amount of drainage in the past 24 hours.  | Physicians should specify an amount for acceptable drainage for the drain to be removed.   |
| 2. Explain procedure to patient; offer analgesia and bathroom as required.  | Taking this step decrease the patient's anxiety about the procedure. Explain to the patient that a pulling sensation may be felt but will stop after the procedure is complete.<br><br>Analgesia provides comfort and achieves the goal of an acceptable pain level for the procedure. |
| 3. Assemble supplies at patient's bedside: dressing tray, sterile suture scissors or a sterile blade, cleansing solution, extra gauze, tape, garbage bag. | Organizing supplies helps the procedure occur as efficiently as possible for the patient.  |
| 4. Apply a waterproof drape/pad for depositing the drain once it has been removed.  | This provides a place to put the drain once it is removed.   |

|   |   |
|---|---|
| <p>5. <a href="#">Perform hand hygiene.</a></p>   | <p>Hand hygiene reduces the risk of infection.</p>  <p><i>Hand hygiene with ABHR</i></p>  |
| <p>6. Apply non-sterile gloves and face shield according to agency policy.</p>              | <p><a href="#">Personal protective equipment</a> reduces the potential for accidental exposure to blood or body fluids.</p>  <p><i>Apply non-sterile gloves</i></p> |
| <p>7. Release suction on reservoir and empty; measure and record drainage if &gt;10 ml.</p> | <p>Releasing suction reduces potential for tissue damage as drain is removed.</p>  <p><i>Release suction cap</i></p>  |
| <p>8. Remove tape and dressing from drain insertion site.</p>                               | <p>Remove tape to allow for ease of drain removal.</p>  |

|   |  |
|---|--|
| <p>9. Cleanse site according to <a href="#">simple dressing change procedure</a>.</p>                       | <p>This step prevents infection of the site and allows the suture to be easily seen for removal.</p>  <p><i>Cleanse drain site</i></p>   |
| <p>10. Carefully cut and remove suture anchoring drain with sterile suture scissors or a sterile blade.</p> |  <p><i>Wound drain may be attached to the skin with one suture to keep it in place</i></p>  <p><i>Snip beneath the suture knot</i></p> <p>Snip beneath the suture knot to ensure contaminated suture is not brought into the tissue. Pull suture out. Snip or cut knot away from yourself.</p> |
| <p>11. Stabilize skin with non-dominant hand.</p>   | <p>Applying counterpressure to skin near the drain decreases discomfort to patient.</p>  |
| <p>12. Ask patient to take a deep breath and exhale slowly; remove the drain as the patient exhales.</p>    | <p>This step helps the patient prepare for removal of the drain.</p>   |

|   |   |
|---|---|
| <p>13. Firmly grasp drainage tube close to skin with dominant hand, and with a swift and steady motion withdraw the drain and place it on the waterproof drape/pad (other hand should stabilize skin with 4 x 4 sterile gauze around drain site).</p> | <p>Slight resistance may be felt.</p> <p>If there is strong resistance, stop, cover site, and call physician.</p> <p>Ensure the drainage tip is intact. The end of the drainage tip should be smooth. Some agencies require that the tip be sent for lab analysis for microorganisms.</p> <p>When pulling out drain, gather up the drain tubing in your hand as it's being removed.</p>  <p><i>Gather drain tubing in your hand as it's being removed</i></p> |
| <p>14. Place drain and tube on waterproof pad or in garbage bag to be disposed of after procedure is complete.</p>  | <p>This step prevents the drain and tube from contaminating bed or floor.</p>   |
| <p>15. Remove gloves and apply new non-sterile gloves.</p>  | <p>This prevents contamination of the drain site.</p>  <p><i>Remove gloves</i></p>  <p><i>Apply new non-sterile gloves</i></p>  |

|  |  |
|--|--|
| <p>16. Cleanse old drain site using aseptic technique according to simple dressing change procedure.</p> | <p>This step prevents contamination of the drain site.</p>   |
| <p>17. Cover drain site with sterile dressing.</p>   | <div> </div> <p><i>Cover drain site with sterile dressing</i></p>   |
| <p>18 Assist patient back to comfortable position and lower bed.</p>                                     | <p>This ensures patient safety and comfort after the procedure.</p>  |
| <p>19. Discard drain in biohazard waste as per hospital policy.</p>                                      | <p>This prevents the spread of microorganisms.</p>   |
| <p>20. <a href="#">Perform hand hygiene.</a></p>   | <p>Hand hygiene prevents the spread of infection.</p> <div> </div> <p><i>Perform hand hygiene</i></p> |
| <p>21. Document output and drain removal.</p>  | <p>Record drainage according to agency policy.</p>   |

|   |   |
|---|---|
| 22. Assess dressing 30 minutes after drain removal.   | Monitor for excessive drainage from the drainage site.<br><br><br><i>Assess dressing 30 minutes after drain removal</i> |
| 23. Document procedure and findings according to agency policy.<br><br>Report any unusual findings or concerns to the appropriate health care professional. | Accurate and timely documentation and reporting promote patient safety.   |
| Data source: BCIT, 2010b; Perry et al., 2014; Saskatoon Health Region, 2012   |   |

## VIDEO 4.6

Watch the video [JP Drain Removal](#) by [Renée Anderson & Wendy McKenzie](#), Thompson Rivers University.

## Critical Thinking Exercises

1. When you start to remove your patient's Jackson-Pratt drain, you notice there is 100 ml of fresh blood in the drainage bulb. What would be your next steps?
2. Describe ways in which you can help relieve the discomfort felt by a patient while removing a wound drain.



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## 4.8 Summary

Wound healing is a complex process. To ensure optimal wound healing, it is essential to identify and control underlying issues that may prevent a wound from healing. Controlling blood sugar levels, limiting smoking, and observing proper nutrition all have a significant impact on the healing process. It is important to educate patients on these modifiable risk factors to promote wound healing. Understanding the process of wound healing, the use of a comprehensive assessment, and the appropriate selection of wound care products can maximize the wound healing process.

### Key Takeaways

- Wound care requires a complete assessment prior to initiating wound treatment. Always compare assessments with previous findings to assess whether wound is healing and if wound treatment is effective.
- Treat the patient (modifiable external and internal factors) and the wound to optimize the healing process.
- Select the appropriate wound treatment based on the wound characteristics, type of wound, and purpose of the dressing.
- Understand the differences between types of wounds and causes, and follow procedures for best practice in the acute and clinical setting.

### SUGGESTED ONLINE RESOURCES

1. [BC Patient Safety and Quality Council: Surgical site infections resources](#). This website provides links to a variety of online resources related to surgical site infections.
2. [Canadian Association of Wound Care \(CAWC\): Education](#). This website offers an education section for health care professionals using various methods to provide flexible, interprofessional education that supports the learning needs and professional career growth in the areas of skin health, wound prevention, and management.
3. [Connecting Learners with Knowledge \(CLWK\)](#). This website, started as a pilot project in 2010, was created by nurses to explore innovative ways to meet their education needs. Membership grew considerably and it soon became a permanent, living resource. In February 2014 it merged with QExchange.ca, which was home to communities for British Columbia health care providers. CLWK is now a growing group of communities that support health care providers as they network and improve care.
4. [Connecting Learners with Knowledge \(CLWK\): Skin & wound care](#). These interactive e-learning modules cover skin and wound care and each take about 25 to 30 minutes to

complete.

5. [Provincial Infection Control Network of British Columbia \(PICNET\)](#). This is the website for PICNET, a program of the Provincial Health Services Authority. Its mission is to reduce health care-associated infections by improving infection prevention control practices.
6. [Vancouver Coastal Health: How wounds heal](#). This 30-minute video is designed for health care professionals who wish to improve their understanding of wound and skin care. Information includes the definition of a wound, the three classifications of wound healing or closure, the trajectory of wound healing, and reasons for delayed wound healing.
7. [Vancouver Coastal Health: Wound assessment](#). This 30-minute video is designed for health care professionals who wish to improve their understanding of wound and skin care. Information includes basic wound etiology, wound location, and wound assessment parameters.

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## Chapter 5. Oxygen Therapy



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## 5.1 Introduction

Oxygen is essential for sustaining life. The cardiovascular and the respiratory systems are responsible for supplying the body's oxygen demands. Blood is oxygenated through the mechanisms of ventilation, perfusion, and the transport of respiratory gases (Potter, Perry, Ross-Kerr, & Wood, 2010).

Respiration is optimal when sufficient oxygenation occurs at the cellular level and when cellular waste and carbon dioxide are adequately removed via the bloodstream and lungs. If this system is interrupted — for example by lung tissue damage, inflammation or excess mucus in the airways, or impairment of ventilation — intervention is required to support the client and prevent the condition from worsening or, potentially, to prevent death from occurring (Perry, Potter, & Ostendorf, 2014).

Oxygen is the most frequently used medication in emergency medicine, and when used appropriately in the treatment of hypoxemia (an inadequate supply of oxygen in the arterial blood), it potentially saves lives (Kane, Decalmer, & O'Driscoll, 2013). This chapter describes the principles of oxygen therapy, the causes and management of hypoxia (the reduction of oxygen supply at the tissue level), and the optimal use of oxygen therapy and treatment modalities.

### Learning Objectives

- Describe the principles of oxygenation
- Understand the functions and limitations of pulse oximetry
- Describe the causes of hypoxia
- Identify when oxygen therapy is needed
- Describe the management of hypoxia
- List hazards, precautions, and complications of oxygen therapy
- Describe how to perform oral suctioning



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## 5.2 Principles

The air we breathe is made up of various gases, 21% of which is oxygen. Therefore, a patient who is receiving no supplemental oxygen therapy is still receiving oxygen from the air. This amount of oxygen is adequate provided that the patient's airway is not compromised and there is sufficient hemoglobin in the blood. The cardiovascular system must also be intact and able to circulate blood to all body tissues. If any of these systems fail, the patient will require supplemental oxygen to increase the likelihood that adequate levels of oxygen will reach all vital body tissues necessary to sustain life.

### OXYGEN IN THE BLOOD

Hemoglobin (Hgb) holds oxygen in reserve until the metabolic demands of the body require more oxygen. The Hgb then moves the oxygen to the plasma for transport to the tissues. The body's demand for oxygen is affected by activity, metabolic status, temperature, and level of anxiety. The ability of Hgb to move the oxygen to the tissues depends on a number of factors, such as oxygen supply, ventilatory effectiveness, nutrition, cardiac output, hemoglobin level, smoking, drug use, and underlying disease. Any one of these factors can potentially impede the supply and transport of oxygen to the tissues.

### MEASUREMENT OF OXYGEN IN THE BLOOD

The vast majority of oxygen carried in the blood is attached to hemoglobin and can be assessed by monitoring the oxygen saturation through pulse oximetry ( $SpO_2$ ). The target range for oxygen saturation as measured by blood analysis ( $SaO_2$ ), such as arterial blood gas, is 92% to 98% for a normal adult. **Arterial blood gas (ABG)** is the analysis of an arterial blood sample to evaluate the adequacy of ventilation, oxygen delivery to the tissues, and acid-base balance status (Simpson, 2004). For patients with COPD, the target  $SaO_2$  range is 88% to 92% (Alberta Health Services, 2015; British Thoracic Society, 2008; Kane et al., 2013). Only about 3% of the oxygen carried in the blood is dissolved in the plasma, which can be assessed by looking at the partial pressure of oxygen in the blood through blood gas analysis ( $PaO_2$ ). The normal  $PaO_2$  of a healthy adult is 80 to 100 mmHg. The  $SpO_2$  is more clinically significant than the  $PaO_2$  in determining the oxygen content of the blood.

Oxygen is considered a medication and therefore requires continuous monitoring of the dose, concentration, and side effects to ensure its safe and effective use (Alberta Health Services, 2015). Oxygen therapy may be indicated for hypoxemia and hypoxia.

### UNDERSTANDING HYPOXEMIA AND HYPOXIA

Although the terms *hypoxemia* and *hypoxia* are often used interchangeably, they do not mean the same thing. **Hypoxemia** is a condition where arterial oxygen tension or partial pressure of oxygen ( $PaO_2$ ) is below normal (<80 mmHg). Hypoxemia is the inadequate supply of oxygen in the arterial

blood. **Hypoxia** is the reduction of oxygen supply at the tissue level, which is not measured directly by a laboratory value (Metrovic, 2014), but by pulse oximetry and SpO<sub>2</sub> (British Thoracic Society, 2008).

Generally, the presence of hypoxemia suggests that hypoxia exists. However, hypoxia may not be present in a patient with hypoxemia if the patient is able to compensate for a low PaO<sub>2</sub> by increasing oxygen supply. This is usually achieved by increasing cardiac output (by raising the heart rate) or by decreasing tissue oxygen consumption. Conversely, patients who do not show signs of hypoxemia may be hypoxic if oxygen delivery to the tissues is diminished or if the tissues are unable to adequately use the oxygen.

Hypoxemia is the most common cause of tissue hypoxia, and if the correct diagnosis is made, it is readily treatable.

The Vancouver Coastal Health Authority (2015) lists three causes of hypoxemia: deadspace and shunts, low inspired oxygen tension, and alveolar hypoventilation.

#### DEADSPACE AND SHUNTS

Ventilation and perfusion are not always equal between the alveoli and pulmonary capillaries. There is sometimes too much perfusion and not enough ventilation in some areas of the lungs, causing a shunt where the blood is unable to pick up oxygen and unload carbon dioxide. In other areas of the lungs, there may be too much ventilation and not enough perfusion, causing deadspace where oxygen is unable to diffuse into the blood.

#### LOW INSPIRED OXYGEN TENSION

Hypoxemia can be caused by breathing air at pressures less than atmospheric pressure, such as at high altitudes or in an enclosed space with inadequate ventilation. The enclosed space may be especially hazardous if there is a low concentration of oxygen or if it contains toxic gases.

#### ALVEOLAR HYPOVENTILATION

If a patient hypoventilates, the level of oxygen in the alveoli will fall, and the level of carbon dioxide will increase. Hypoxemia occurs because less oxygen is moved into the pulmonary blood flow.

Examples of medical conditions that cause hypoxemia include:

- Asthma
- COPD
- Heart failure
- Pleural effusions
- Pneumonia
- Pneumothorax
- Pulmonary edema
- Pulmonary emboli

With hypoxia, there is inadequate transport of oxygen to the cells or tissues, either because of obstruction, secretions, or tumours in the lungs; hypoventilation due to disease, injury to the respiratory system, or medications; or poor blood flow due to a compromised circulatory system (British Thoracic Society, 2008). Hypoxia related to anemia or circulatory system compromise, such as decreased cardiac output, will respond poorly to oxygen therapy, and other appropriate interventions should be considered.

Hypoxia is a medical emergency (Alberta Health Services, 2015). Oxygen therapy will:

- Decrease the work of breathing in patients with respiratory or cardiovascular conditions, which may prevent respiratory and muscle fatigue (Jardins & Burton, 2011).
- Decrease cardiopulmonary workload by reducing high cardiopulmonary demand (Perry et al., 2014). For example, patients with left ventricular failure benefit from additional oxygen to the tissues because the heart cannot provide enough oxygen to the tissues due to decreased cardiac output.
- Support post-operative recovery, and may be ordered for a specific time frame at a specific rate while the patient recovers from the surgical procedure.

#### Critical Thinking Exercises

1. How do you know if your patient is hypoxic or hypoxemic? Please explain.
2. Why would the post-surgical patient require supplemental oxygen?



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## 5.3 Pulse Oximetry

Oxygen saturation, sometimes referred to as “the fifth vital sign,” should be checked by pulse oximetry in all breathless and acutely ill patients (British Thoracic Society, 2008). SpO<sub>2</sub> and the inspired oxygen concentration should be recorded on the observation chart together with the oximetry result. The other vital signs of pulse, blood pressure, temperature, and respiratory rate should also be recorded in situations where supplemental oxygen is required.

Pulse oximetry is a painless, non-invasive method to monitor SpO<sub>2</sub> intermittently and continuously. The use of a pulse oximeter (see Figure 5.1) is indicated in patients who have, or are at risk for, impaired gaseous exchange or an unstable oxygen status.



*Figure 5.1 Pulse oximeter*

The pulse oximeter is a probe with a light-emitting diode (LED) that is attached to the patient’s finger, forehead, or ear. Beams of red and infrared light are emitted from the LED, and the light wavelengths are absorbed differently by the oxygenated and the deoxygenated hemoglobin (Hgb) molecules. The receiving sensor measures the amount of light absorbed by the oxygenated and deoxygenated Hgb in the arterial (pulsatile) blood. The more Hgb that is saturated with oxygen, the higher the SpO<sub>2</sub>, which should normally measure above 95%.

Pulse oximeters have an indicator of signal strength (such as a bar graph, audible tone, waveform, or flashing light) to show how strong the receiving signal is. Measurements should be considered inaccurate if the signal strength is poor.

Pulse oximeters will also indicate heart rate by counting the number of pulsatile signals. To ensure accuracy, count the patient’s pulse rate by taking the pulse and comparing it to the pulse rate shown on the pulse oximeter.

### **LIMITATIONS**

The most common cause of inaccuracy with pulse oximeters is motion artifact. Patient movement

can cause pulsatile venous flow to be incorrectly measured as arterial pulsations, thus producing an inaccurate oximetry and pulse-rate reading.

Another common cause of inaccuracy is poor peripheral perfusion. Poor peripheral perfusion can be caused by conditions such as hypothermia, peripheral vascular disease, vasoconstriction, hypotension, or peripheral edema (Perry, Potter, & Ostendorf, 2014). A forehead probe can be used for patients with decreased peripheral perfusion.

Conditions such as jaundice, as well as intravascular dyes and carbon monoxide in the blood, can also influence oximetry readings. Anemic patients with low Hgb may have a normal SpO<sub>2</sub> reading, even though the available oxygen is not enough to meet the metabolic demands of the body. Patients with elevated bilirubin concentrations may also have falsely low SpO<sub>2</sub> readings (Howell, 2002).

## APPLICATION OF PULSE OXIMETRY

If measuring SpO<sub>2</sub> by attaching the probe to a finger or toe, check the radial or pedal pulse and capillary refill of the finger or toe you plan to use. If the patient's extremities are cold, you could try to warm his or her hands in yours, or apply warm towels to improve perfusion.

The patient's finger or toe should be clean and dry. Check that the patient does not have artificial nails or nail polish, as both will influence the light transmission and should, therefore, be removed before applying pulse oximetry.

Check that the probe is positioned properly so that optical shunting (when light from the transmitter passes directly into the receiver without going through the finger) does not occur.

Bright ambient light may also affect the accuracy of pulse oximetry readings.

## HAZARDS OF PULSE OXIMETRY

Pulse oximetry is generally considered to be a safe procedure. However, tissue injury may occur at the measuring site as a result of probe misuse. Pressure sores or burns are possible effects of prolonged application (>2 hours).

### Critical Thinking Exercises

1. You are checking your patient's SpO<sub>2</sub> but the signal strength on the pulse oximeter is poor. What would be your next steps?
2. Your patient has been admitted with a diagnosis of carbon monoxide poisoning with an SpO<sub>2</sub> of 98%. What does this reading tell you?

---

## 5.4 Signs and Symptoms of Hypoxia

Assessment for hypoxia can be done by completing a medical history, determining current medical condition, and performing a respiratory assessment. If a patient is experiencing any of the signs and symptoms listed in Table 5.1, hypoxia may be present.

Hypoxia must be treated immediately by the health care provider, as a lack of oxygen to tissues and organs can create serious complications (Alberta Health Services, 2015).

**Table 5.1 Signs and Symptoms of Hypoxia**

| <i>Safety considerations:</i>  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Presence of symptoms depends on the patient's age, presence of disease process, level of health, and presence of chronic illness.</li> <li>• Consider any underlying causes of hypoxia, such as COPD, heart failure, anemia, and pneumonia, which need to be corrected to prevent and manage hypoxia (Perry et al., 2007).</li> <li>• Early signs of hypoxia are anxiety, confusion, and restlessness; if hypoxia is not corrected, hypotension will develop.</li> <li>• As hypoxia worsens, the patient's vital signs, activity tolerance, and level of consciousness will decrease.</li> <li>• Late signs of hypoxia include bluish discoloration of the skin and mucous membranes, where vasoconstriction of the peripheral blood vessels or decreased hemoglobin causes <b>cyanosis</b>. Cyanosis is most easily seen around the lips and in the oral mucosa. Never assume the absence of cyanosis means adequate oxygenation.</li> </ul> |   |
| SIGNS AND SYMPTOMS   | INDICATIONS   |
| Tachypnea  | Increased respiration rate is an indication of respiratory distress.  |
| Dyspnea  | Shortness of breath (SOB) is an indication of respiratory distress.   |
| Use of accessory muscles   | Use of neck or intercostal muscles when breathing is an indication of respiratory distress.   |
| Noisy breathing  | Audible noises with breathing, or wheezes and crackles, are an indication of respiratory conditions. Assess lung sounds for adventitious sounds such as wheezing or crackles. Secretions can plug the airway, thereby decreasing the amount of oxygen available for gas exchange in the lung. |
| Decreased oxygen saturation levels   | Oxygen saturation levels should be between 92% and 98% for an adult without an underlying respiratory condition. Lower than 92% is considered hypoxic. For patients with COPD, oxygen saturation levels may range from 88% to 92%. Lower than 88% is considered hypoxic.                      |
| Flaring of nostrils or pursed lips   | Patients who are hypoxic may breathe differently, which may signal the need for supplemental oxygen.  |
| Skin colour of patient   | Changes in skin colour to bluish or gray are a late sign of hypoxia.  |

|   |  |
|---|--|
| Position of patient   | Patients in respiratory distress may voluntarily sit up or lean over by resting arms on their legs to enhance lung expansion. Patients who are hypoxic may not be able to lie flat in bed. |
| Ability of patient to speak in full sentences                   | Patients in respiratory distress may be unable to speak in full sentences, or may need to catch their breath between sentences.  |
| Change in mental status or loss of consciousness (LOC)          | This is a worsening and a late sign of hypoxia.  |
| Restlessness or anxiety   | This is an early sign of hypoxia.  |
| Data source: British Thoracic Society, 2008; Perry et al., 2014 |  |

#### Critical Thinking Exercises

1. Your patient is tachypneic and dyspneic. What is the first step you should take to ensure maximal lung expansion?
2. Your patient is sitting up at 90 degrees, but is still showing signs of hypoxia. What would be your best steps?



---

## 5.5 Oxygen Therapy Systems

Tissue oxygenation is dependent on optimal or adequate delivery of oxygen to the tissues. Increasing the concentration of inhaled oxygen is an effective method of increasing the partial pressure of oxygen in the blood and correcting hypoxemia. Simply stated, **oxygen therapy** is a means to provide oxygen according to target saturation rates (as per physician orders or hospital protocol) to achieve normal or near normal oxygen saturation levels for acute and chronically ill patients (British Thoracic Society, 2008). Those administering oxygen must monitor the patient to keep the saturation levels within the required target range. Oxygen should be reduced or discontinued in stable patients with satisfactory oxygen saturation levels (Perry et al., 2014).

Hypoxemia or hypoxia is a medical emergency and should be treated promptly. Failure to initiate oxygen therapy can result in serious harm to the patient. The essence of oxygen therapy is to provide oxygen according to target saturation rates, and to monitor the saturation rate to keep it within target range. The target range (SaO<sub>2</sub>) for a normal adult is 92% to 98%. For patients with COPD, the target SaO<sub>2</sub> range is 88% to 92% (Alberta Health Services, 2015; British Thoracic Society, 2008; Kane, et al., 2013).

Although all medications given in the hospital require a prescription, oxygen therapy may be initiated without a physician order in emergency situations. Most hospitals will have a protocol in place to allow health care providers to apply oxygen in emergency situations. The health care provider administering oxygen is responsible for monitoring the patient response and keeping the oxygen saturation levels within the target range.

The most common reasons for initiating oxygen therapy include acute hypoxemia related to pneumonia, shock, asthma, heart failure, pulmonary embolus, myocardial infarction resulting in hypoxemia, post-operative states, pneumothorax, and abnormalities in the quality and quantity of hemoglobin. There are no contraindications to oxygen therapy if indications for therapy are present (Kane et al., 2013).

### **OXYGEN DELIVERY SYSTEMS**

There is a wide variety of devices available to provide oxygen support. Delivery systems are classified as low-flow or high-flow equipment, which provide an uncontrolled or controlled amount of supplemental oxygen to the patient (British Thoracic Society, 2008). Selection should be based on preventing and treating hypoxemia and preventing complications of hyper-oxygenation. Factors such as how much oxygen is required, the presence of underlying respiratory disease, age, the environment (at home or in the hospital), the presence of an artificial airway, the need for humidity, a tolerance or a compliance problem, or a need for consistent and accurate oxygen must be considered to select the correct oxygen delivery device (British Thoracic Society, 2008). Table 5.2 lists the types of oxygen equipment.

**Table 5.2 Types of Oxygen Equipment**

| Types of Oxygen Equipment              | Additional Information  |
|--|---|
| <p>Nasal-cannula (low-flow system)</p> | <p>Nasal cannula consists of a small bore tube connected to two short prongs that are inserted into the nares to supply oxygen directly from a flow meter or through humidified air to the patient. It is used for short- or long-term therapy (i.e., COPD patients), and is best used with stable patients who require low amounts of oxygen.</p> <p>Advantages: Can provide 24% to 40% O<sub>2</sub> (oxygen) concentration. Most common type of oxygen equipment. Can deliver O<sub>2</sub> at 1 to 6 litres per minute (L/min). It is convenient as patient can talk and eat while receiving oxygen. May be drying to nares if level is above 4 L/min. Easy to use, low cost, and disposable.</p> <p>Limitations: Easily dislodged, not as effective is a patient is a mouth breather or has blocked nostrils or a deviated septum or polyps.</p> <div> </div> <p><i>Applying a nasal cannula</i></p> <div> </div> <p><i>Nasal cannula</i></p> |

**Simple face mask  
(low-flow system)**

A mask fits over the mouth and nose of the patient and consists of exhalation ports (holes on the side of the mask) through which the patient exhales CO<sub>2</sub> (carbon dioxide). These holes should always remain open. The mask is held in place by an elastic around the back of the head, and it has a metal piece to shape over the nose to allow for a better mask fit for the patient. Humidified air may be attached if concentrations are drying for the patient.

**Advantages:** Can provide 40% to 60% O<sub>2</sub> concentration. Flow meter should be set to deliver O<sub>2</sub> at 6 to 10 L/min. Used to provide moderate oxygen concentrations. Efficiency depends on how well mask fits and the patient's respiratory demands. Readily available on most hospital units. Provides higher oxygen for patients.

**Disadvantages:** Difficult to eat with mask on. Mask may be confining for some patients, who may feel claustrophobic with the mask on.



*Simple face mask*

Non re-breather mask (high-flow system)



Consists of a simple mask and a small reservoir bag attached to the oxygen tubing connecting to the flow meter. With a re-breather mask, there is no re-breathing of exhaled air. It has a series of one-way valves between the mask and the bag and the covers on the exhalation ports. On inspiration, the patient only breathes in from the reservoir bag; on exhalation, gases are prevented from flowing into the reservoir bag and are directed out through the exhalation ports.

Advantages: With a good fit, the mask can deliver between 60% and 80% **FiO<sub>2</sub> (fraction of inspired oxygen)**. The flow meter should be set to deliver O<sub>2</sub> at 10 to 15 L/min. Flow rate must be high enough to ensure that the reservoir bag remains partially inflated during inspiration.

Disadvantages: These masks have a risk of suffocation if the gas flow is interrupted. The bag should never totally deflate. The patient should never be left alone unless the one-way valves on the exhalation ports are removed. This equipment is used by respiratory therapists for specific short-term, high oxygen requirements such as pre-intubation and patient transport. They are not available on general wards due to: 1. the risk of suffocation, 2. the chance of hyper-oxygenation, and 3. their possible lack of humidity. The mask also requires a tight seal and may be hot and confining for the patient. The mask will interfere with talking and eating.



*Non re-breather mask*

|  |  |
|--|--|
| <p>Partial re-breather mask (high-flow system)</p> | <p>The bag should always remain partially inflated. The flow rate should be high enough to keep the bag partially inflated.</p> <p>Advantages: Can deliver 10 to 12 L/min for an O<sub>2</sub> concentration of 80% to 90%. Used short term for patients who require high levels of oxygen.</p> <p>Disadvantages: The partial re-breather bag has no one-way valves, so the expired air mixes with the inhaled air. The mask may be hot and confining for the patient and will interfere with eating and talking.</p>  <p><i>Partial re-breather mask</i></p> |
| <p>Face tent (low-flow system)</p>                 | <p>The mask covers the nose and mouth and does not create a seal around the nose.</p> <p>Advantages: Can provide 28% to 100% O<sub>2</sub> Flow meter should be set to deliver O<sub>2</sub> at a minimum of 15 L/min. Face tents are used to provide a controlled concentration of oxygen and increase moisture for patients who have facial burn or a broken nose, or who are claustrophobic.</p> <p>Disadvantages: It is difficult to achieve high levels of oxygenation with this mask.</p>  <p><i>Face tent</i></p>                                     |

|  |  |
|--|--|
| <p>Venturi mask<br/>(high-flow system)</p>                                       | <p>High-flow system consisting of a bottle of sterile water, corrugated tubing, a drainage bag, air/oxygen ratio nebulizer system, and a mask that works with the corrugated tubing. The mask may be an aerosol face mask, tracheostomy mask, a T-piece, or a face tent. The key is that the flow of oxygen exceeds the peak inspiratory flow rate of the patient, and there is little possibility for the patient to breathe in air from the room</p> <p>Advantages: The system can provide 24% to 60% O<sub>2</sub> at 4 to 12 L/min. Delivers a more precise level of oxygen by controlling the specific amounts of oxygen delivered. The port on the corrugated tubing (base of the mask) sets the oxygen concentration. Delivers humidified oxygen for patient comfort. It does not dry mucous membranes.</p> <p>Disadvantages: The mask may be hot and confining for some patients, and it interferes with talking and eating. Need a properly fitting mask. Nurses may be asked to set up a high-flow system. In other instances, respiratory therapists may be responsible for regulating and monitoring the high-flow systems.</p> <div> </div> <p style="text-align: center;"><i>Venturi mask</i></p> |
| <p>Data source: Perry et al., 2014; Vancouver Coastal Health Authority, 2015</p> |  |

*Special considerations:*

- Review the protocol at your health authority prior to initiating any high-flow oxygen systems, and consult your respiratory therapist.
- In general, nasal prongs and a simple face mask (low-flow oxygen equipment) may be applied by a health care provider. All other oxygen equipment (high-flow systems) must be set up and applied by a respiratory therapist.
- For patients with asthma, nebulizer treatments should use oxygen at a rate greater than 6 L/min. The patient should be changed back to previous oxygen equipment when treatment is complete.

- Oxygenation is reduced in the supine position. Hypoxic patients should be placed in an upright position unless contraindicated (e.g., if they have spinal injuries or loss of consciousness).
- In general, for most patients with COPD, target saturation is 88% to 92%. It is important to recognize COPD patients are at risk for hypercapnic respiratory failure.
- Check the function of the equipment and complete a respiratory assessment at least once each shift for low-flow oxygen and more often for high-flow oxygen.
- In acutely ill patients, oxygen saturation levels may require additional ABGs to regulate and manage oxygen therapy.
- Oxygen saturation levels and delivery equipment should be documented on the patient's chart.

## INCREASING OXYGEN IN THE LUNGS

The use of oxygen delivery systems is only one component to increasing oxygen to the alveolar capillary bed to allow for optimal oxygenation to the tissues. Additional methods to increase oxygen saturation levels in the body include (Perry et al., 2014):

- Maintaining satisfactory airway
- Optimizing oxygen-carrying capacities (hemoglobin levels)
- Reversing any respiratory depressants
- Using invasive or non-invasive ventilation when necessary
- Treating airflow obstruction with bronchodilators and sputum-clearing techniques
- Treating pulmonary edema as required

### Critical Thinking Exercises

1. Explain the difference between low- and high-flow oxygen systems.
2. The reservoir bag on a non re-breather mask and a partial re-breather mask must always be kept partially inflated. Why?



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## 5.6 Management of Hypoxia



Hypoxemia or hypoxia is a medical emergency and should be treated promptly. Failure to initiate oxygen therapy can result in serious harm to the patient. The essence of oxygen therapy is to provide oxygen according to target saturation rate, and to monitor the saturation rate to keep it within target range. The target range ( $\text{SaO}_2$ ) for a normal adult is 92 – 98%. For patients with COPD, the target  $\text{SaO}_2$  range is 88 – 92% (Alberta Health Services, 2015; Kane, et al., 2013; Perry et al., 2014).


Although all medications require a prescription, oxygen therapy may be initiated without a physician's order in emergency situations. Hypoxia is considered an emergency situation. Most hospitals have a protocol in place allowing health care providers to apply oxygen in emergency situations. The health care provider administering oxygen is responsible for monitoring the patient response and keeping the oxygen saturation levels within the target range. The most common reasons for initiating oxygen therapy include acute hypoxemia related to pneumonia, shock, asthma, heart failure, pulmonary embolus, myocardial infarction resulting in hypoxemia, post operative states, pneumothorax, and abnormalities in the quality and quantity of hemoglobin. There are no contradictions to oxygen therapy if indications for therapy are present (Kane et al., 2013).

Hypoxic patients must be assessed for the causes and underlying reasons for their hypoxia. Hypoxia must be managed not only with supplemental oxygen but in conjunction with the interventions outlined in Table 5.3.

**Table 5.3 Interventions to Treat and Prevent Hypoxia**

| <b>Interventions</b>                   | <b>Additional Information</b>   |
|--|---|
| Raise the head of the bed              | <p>Raising the head of the bed promotes effective breathing and diaphragmatic descent, maximizes inhalation, and decreases the work of breathing. Positioning enhances airway patency in all patients. A Fowler's or semi-Fowler's position promotes a patient's chest expansion with the least amount of effort. Patients with COPD who are short of breath may gain relief by sitting with their back against a chair and rolling their head and shoulders forward or leaning over a bedside table while in bed.</p>  <p><i>High Fowler's position</i></p>  |
| Deep breathing and coughing techniques | <p>Deep breathing and coughing techniques help patients effectively clear their airway while maintaining their oxygen levels. Teach patients "controlled coughing" by having them take a deep breath in and cough deeply with the mouth slightly open. If they have difficulty coughing, teach the huffing technique. This involves taking a medium breath and then making a sound like "ha" to push the air out fast with the mouth slightly open. This is done three or four times, and then they are instructed to cough. If secretions are thick and tenacious, the patient may be dehydrated and require additional fluids (if medical condition does not contraindicate additional fluids).</p> |

|  |  |
|--|--|
| <p>Oxygen therapy and equipment</p>    | <p>If patient is already on supplemental oxygen, ensure equipment is turned on and set at the required flow rate and is connected to an oxygen supply source. If a portable tank is being used, check the oxygen level in the tank. Ensure the connecting oxygen tubing is not kinked, which could obstruct the flow of oxygen. Feel for the flow of oxygen from the exit ports on the oxygen equipment. In hospitals where medical air and oxygen are used, ensure patient is connected to the oxygen flow port.</p>  <p><i>Applying nasal prongs</i></p> |
| <p>Assess need for bronchodilators</p> | <p>Pharmacological management is essential for patients with respiratory disease. Medications such as bronchodilators effectively relax smooth muscles and open airways in certain disease processes such as COPD. Glucocorticoids relieve inflammation and also assist in opening air passages. Mucolytics and adequate hydration decrease the thickness of pulmonary secretions so that they can be expectorated more easily.</p>  <p><i>Assess need for bronchodilation</i></p>   |

|   |  |
|---|--|
| Oral suctioning   | <p>Some patients may have a weakened cough that inhibits their ability to clear secretions from the mouth and throat. Patients with muscle disorders or who have experienced a cerebral vascular accident (CVA) are at risk for aspiration related to ineffective cough reflex, which could lead to hypoxia. Provide oral suction if patient is unable to clear secretions, foreign debris, or mucous from the mouth and pharynx. See <a href="#">Checklist 42</a> for further directions.</p>  <p style="text-align: center;"><i>Oral suctioning may be necessary</i></p> |
| Pain relief   | Provide adequate pain relief. Pain is known to increase the metabolic demands on the body, which in turn increases the need for more oxygen supply.  |
| Devices to enhance secretion clearance  | Many devices assist with secretion clearance, such as vests that inflate with large volumes of air and vibrate the chest wall, and handheld devices that help provide positive expiratory pressure to prevent airway collapse in exhalation. Usefulness of these therapies is decided based on the individual patient's situation and the preference of both the patient and care provider.  |
| Frequent rests in between activities  | <p>Patients experiencing hypoxia often feel short of breath (SOB) and fatigue easily. Allow patient to rest frequently, and space out interventions to decrease oxygen demand in patients whose reserves are likely limited. Has the patient just returned from a walk down the hall or to the bathroom?</p> <p>Assess for underlying causes of the hypoxia. Is the potential problem respiratory or cardiovascular? What underlying respiratory or cardiovascular conditions exist? Complete respiratory and cardiovascular assessments may reveal potential abnormalities in these systems.</p>  |
| Obstructive sleep apnea   | Patients with obstructive sleep apnea (OSA) may be unable to maintain a patent airway. In OSA, nasopharyngeal abnormalities that cause narrowing of the upper airway produce repetitive airway obstruction during sleep, with the potential for periods of apnea and hypoxemia. Pressure can be delivered during the inspiratory and expiratory phases of the respiratory cycle by using a mask to maintain airway patency during sleep. The process requires consideration of each individual's needs in order to obtain compliance.  |
| Anxiety and depression  | The most common co-morbidities of COPD are anxiety and depression. Anxiety is related to chronic shortness of breath and an inability to breathe effectively. Anxiety and depression are chronically undertreated and may be relieved with breathing retraining, counselling, relaxation techniques, or anti-anxiety medications if appropriate.   |
| Data source: Cigna & Turner-Cigna, 2005; Kane et al., 2013; Maurer et al., 2008; Perry et al., 2007; Perry et al., 2014; Shackell & Gillespie, 2009 |  |

## APPLYING AND TITRATING OXYGEN THERAPY

When providing oxygen therapy, remember the following (Kane et al., 2013):

- Initiate oxygen according to hospital protocols when patients with respiratory or cardiovascular conditions warrant its use.
- Always assess for underlying respiratory diseases. Patients with COPD are at risk for acute hypoventilation and carbon dioxide retention. Elevated CO<sub>2</sub> levels increase risk for respiratory failure or hyperventilation. With COPD patients, always check the physician orders for the required amount of oxygen and acceptable SaO<sub>2</sub> range.
- Regardless of underlying conditions, your first priority should be to prevent or treat hypoxia. Never withhold oxygen for COPD patients while waiting for additional medical interventions (Alberta Health Services, 2015; British Thoracic Society, 2008).
- Check all equipment for safety and function at least once per shift. Check oxygen equipment more frequently if using a high-flow system, which requires higher oxygen concentration.
- Avoid interruption of oxygen therapy during patient transport.
- When patient has a tracheostomy or a high-flow oxygen system and is being transported out of your care, contact respiratory therapy for assistance.

Oxygen is available in hospitals through bulk liquid oxygen systems that dispense oxygen as a gas through outlets in rooms. It can also be provided in cylinders (large or small) for easy transport for patient use while mobile or when moving around the hospital. An oxygen flow meter regulates the flow in litres per minute. Oxygen therapy may be short- or long-term depending on the SaO<sub>2</sub> requirements of the patients and underlying diseases processes (Perry et al., 2014).

Checklist 41 reviews the steps for applying and titrating oxygen therapy (see Figure 5.2).

**Checklist 41: Applying and Titrating Oxygen Therapy**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- [Perform hand hygiene.](#)
- Check room for [additional precautions.](#)
- Introduce yourself to patient.
- Check patient's name band to confirm identification.
- Explain process to patient.
- Use appropriate listening and questioning skills.
- Listen and attend to patient cues.
- Ensure patient's privacy and dignity.
- Apply principles of [asepsis and safety.](#)

| STEPS   | ADDITIONAL INFORMATION   |
|---|--|
| 1. Complete respiratory assessment for hypoxia. SaO <sub>2</sub> should be greater than 92% unless otherwise stated by the physician. The goal is to use the least amount of oxygen to maintain levels between 92% and 98%. | <p>Assess need for O<sub>2</sub>: check SaO<sub>2</sub> level with a pulse oximetry device.</p> <p>Assess for underlying medical conditions or alternate causes of hypoxia (cardiovascular).</p>   |
| 2. If a patient requires oxygen therapy, choose an oxygen delivery system based on your patient's requirements.   | <p>Oxygen is initially started at a low concentration (2 L/min) using nasal prongs. Then the flow is titrated up to maintain oxygen saturation of 92% or greater.</p> <p>Selection of delivery system is based on the level of oxygen support required (controlled or non-controlled), the severity of hypoxia, and the disease process. Other factors include age, presence of underlying disease (COPD), level of health, presence of an artificial airway, and environment (home or hospital).</p> <p>Significant decreases to O<sub>2</sub> saturation levels or large increases to maintain O<sub>2</sub> saturation should be reported promptly to responsible health care provider.</p> |
| 3. Once oxygen is applied, reassess your patient in 5 minutes to determine the effects on the body.   | <p>Hypoxia should be reduced or prevented. O<sub>2</sub> levels should be between 92% and 98%.</p> <p>Assess vital signs, respiratory and cardiovascular systems, and level of consciousness. Assess and implement additional treatments for hypoxia if appropriate.</p> <p>Reassess your patient if signs and symptoms of hypoxia return.</p>   |

|  |  |
|--|--|
| 4. If required, adjust O <sub>2</sub> levels.  | <p>Changes in O<sub>2</sub> percentages should be in 5% to 10% increments.</p> <p>Patients should be reassessed (respiratory assessment including O<sub>2</sub> saturations) after 5 minutes following any changes to oxygenation levels.</p> <p>Changes in litre flow should be in 1 to 2 L increments.</p> <p>Consider changing O<sub>2</sub> delivery device if O<sub>2</sub> saturation levels are not maintained in target range.</p> <p>Slow, laboured breathing is a sign of respiratory failure.</p> |
| 5. If hypoxia continues, contact respiratory therapist or physician for further orders according to agency protocol. | <p>Patient may require further interventions from the respiratory therapist or most responsible health care provider.</p> <p>Signs and symptoms of respiratory deterioration include increased respiratory rate, increased requirement of supplemental oxygen, inability to maintain target saturation level, drowsiness, decrease in level of consciousness, headache, or tremors.</p>  |
| Data source: British Thoracic Society, 2008; Perry et al., 2014  |  |

*Special considerations:*

- The underlying condition causing hypoxia must be treated to manage and improve patient outcomes. For example, if hypoxia is caused by pneumonia, additional treatment for hypoxia may include antibiotics, increased fluid intake, oral suctioning, position changes, and deep breathing and coughing exercises.
- If a patient has COPD, check physician order for the amount of required oxygen and the expected saturation level. In general, COPD patients receive 1 to 2 L/min (Kane et al., 2013).
- Once oxygen saturation levels are within normal range, perform a respiratory assessment every two to four hours to monitor need for supplemental oxygen.
- When using oxygen therapy, assess the patient's skin where the oxygen device comes into contact with the patient. The nose, chin, and ears may have skin breakdown due to the irritation of the tubing on the skin. Oxygen therapy tends to cause drying effects to the nares and mouth. To prevent the drying effect, consider increasing fluid intake (if not contraindicated). Perform frequent mouth care and apply humidification if the patient is receiving more than 4 L/min (Perry et al., 2014).

### INITIATION AND TITRATION OF OXYGEN

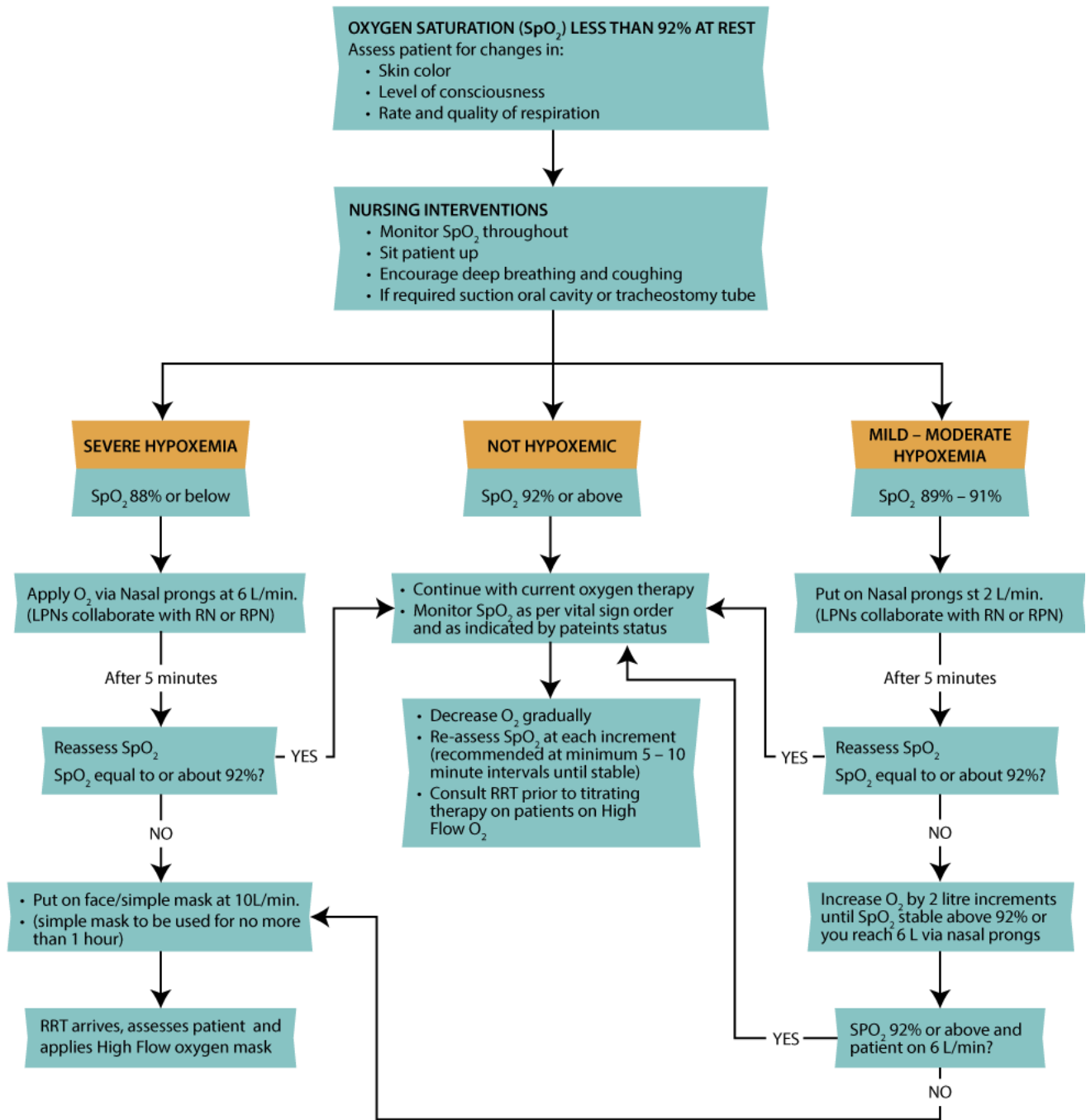


Figure 5.2 Oxygen therapy protocol (adapted from Providence Health Care, 2008)

### Critical Thinking Exercises

1. A patient is admitted with COPD and pneumonia and has an oxygen saturation of 88% on 1 L/min of oxygen. Is this an appropriate oxygenation level for a patient with COPD? Why?
2. A patient with no underlying respiratory disease is hypoxic with an oxygen saturation level of 91% on room air. What are four additional interventions that may help improve oxygen saturation levels without applying oxygen therapy?



## 5.7 Cautions with Oxygen Therapy

Oxygen therapy supports life and supports combustion. While there are many benefits to inhaled oxygen, there are also hazards and side effects. Anyone involved in the administration of oxygen should be aware of potential hazards and side effects of this medication. Oxygen should be administered cautiously and according to the safety guidelines listed in Table 5.4.

**Table 5.4 Oxygen Safety Guidelines for Home and Hospital**

| <b>Guideline</b>  | <b>Additional Information</b>  |
|---|--|
| Oxygen is a medication.   | Remind patient that oxygen is a medication and should not be adjusted without consultation with a physician or respiratory therapist.  |
| Storage of oxygen cylinders   | When using oxygen cylinders, store them upright, chained, or in appropriate holders so that they will not fall over.   |
| No smoking  | Oxygen supports combustion. No smoking is permitted around any oxygen delivery devices in the hospital or home environment.  |
| Keep oxygen cylinders away from heat sources.                             | Keep oxygen delivery systems at least 1.5 metres from any heat source.   |
| Check for electrical hazards in the home or hospital prior to use.        | Determine that electrical equipment in the room or home is in safe working condition. A small electrical spark in the presence of oxygen will result in a serious fire. The use of a gas stove, kerosene space heater, or smoker is unsafe in the presence of oxygen. Avoid items that may create a spark (e.g., electrical razor, hair dryer, synthetic fabrics that cause static electricity, or mechanical toys) with nasal cannula in use. |
| Check levels of oxygen in portable tanks.                                 | Check oxygen levels of portable tanks before transporting a patient to ensure that there is enough oxygen in the tank.   |
| ABGs should be ordered for all critically ill patients on oxygen therapy. | High concentrations of oxygen therapy should be closely monitored with formal assessments (pulse oximetry and ABGs).   |
| Data source: British Thoracic Society, 2008; Perry et al., 2014           |  |

### PRECAUTIONS AND COMPLICATIONS OF OXYGEN THERAPY

Oxygen is essential to life, but as a drug it has both a maximum positive benefit and an accompanying toxicity effect. The toxic effects from oxygen therapy can occur based on the condition of the patient and the duration and intensity of the oxygen therapy. For example, with normal lung function, a stimulation to take another breath occurs when a patient has a slight rise in **PaCO<sub>2</sub>**. The slight rise in PaCO<sub>2</sub> stimulates the respiratory centre in the brain, creating the impulse to take another breath. In some patients with a chronically high level of PaCO<sub>2</sub>, such as those with chronic obstructive pulmonary disease (COPD), the stimulus and drive to breathe is caused by a decrease in PaO<sub>2</sub>. This is

called a **hypoxic drive**. When administering oxygen to patients with known CO<sub>2</sub> retention, watch for signs of hypoventilation, a decreased level of consciousness, and apnea.

Oxygen therapy can have harmful effects, which are dependent on the duration and intensity of the oxygen therapy. See Table 5.5 for precautions and complications of oxygen therapy.

**Table 5.5 Precautions and Complications of Oxygen Therapy**

| Complications  | Precautions  |
|--|--|
| Oxygen-induced hypoventilation/ hypoxic drive                    | <p>If patients with a hypoxic drive are given a high concentration of oxygen, their primary urge to breathe is removed and hypoventilation or apnea may occur. It is important to note that not all COPD patients have chronic retention of CO<sub>2</sub>, and not all patients with CO<sub>2</sub> retention have a hypoxic drive. It is not commonly seen in clinical practice.</p> <p>Never deprive any patient of oxygen if it is clinically indicated. It is usually acceptable to administer whatever concentration of oxygen is needed to maintain the SpO<sub>2</sub> between 88% and 92% in patients with known chronic CO<sub>2</sub> retention verified by an ABG.</p>   |
| Absorption atelectasis   | <p>About 80% of the gas in the alveoli is nitrogen. If high concentrations of oxygen are provided, the nitrogen is displaced. When the oxygen diffuses across the alveolar-capillary membrane into the bloodstream, the nitrogen is no longer present to distend the alveoli (called a nitrogen washout).</p> <p>This reduction in alveolar volume results in a form of collapse called absorption atelectasis. This situation also causes an increase in the physiologic shunt and resulting hypoxemia.</p>   |
| Oxygen toxicity  | <p>Oxygen toxicity, caused by excessive or inappropriate supplemental oxygen, can cause severe damage to the lungs and other organ systems. High concentrations of oxygen, over a long period of time, can increase free radical formation, leading to damaged membranes, proteins, and cell structures in the lungs. It can cause a spectrum of lung injuries ranging from mild tracheobronchitis to diffuse alveolar damage.</p> <p>For this reason, oxygen should be administered so that appropriate target saturation levels are maintained.</p> <p>Supplemental oxygen should be administered cautiously to patients with herbicide poisoning and to patients receiving bleomycin. These agents have the ability to increase the rate of development of oxygen toxicity.</p> |
| Data source: British Thoracic Society, 2008; Perry et al., 2014. |  |

### Critical Thinking Exercises

1. A patient is being discharged with low oxygen levels and will receive home oxygen. Name four

vital safety components to review with the patient prior to discharge.

2. COPD patients are at risk for developing a complication called oxygen-induced hypoventilation. What is the cause of this complication and how can it be prevented?



---

## 5.8 Oral Suctioning

The purpose of oral suctioning is to maintain a patent airway and improve oxygenation by removing mucous secretions and foreign material (vomit or gastric secretions) from the mouth and throat (oropharynx). **Oral suction** is the use of a rigid plastic suction catheter, known as a yankauer (see Figure 5.3), to remove pharyngeal secretions through the mouth (Perry et al., 2014). The suction catheter has a large hole for the thumb to cover to initiate suction, along with smaller holes along the end, which mucous enters when suction is applied. The oral suctioning catheter is not used for tracheotomies due to its large size. Oral suctioning is useful to clear secretions from the mouth in the event a patient is unable to remove secretions or foreign matter by effective coughing. Patients who benefit the most include those with CVAs, drooling, impaired cough reflex related to age or condition, or impaired swallowing (Perry et al., 2014). The procedure for oral suctioning can be found in Checklist 42.



*Figure 5.3 Suctioning with a yankauer*

**Checklist 42: Oral Suctioning**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- Avoid oral suctioning on patients with recent head and neck surgeries.
- Use clean technique for oral suctioning.
- Know which patients are at risk for aspiration and are unable to clear secretions because of an impaired cough reflex. Keep supplies readily available at the bedside and ensure suction is functioning in the event oral suctioning is required immediately.
- Know appropriate suctioning limits and the risks of applying excessive pressure or inadequate pressure.
- Avoid mouth sutures, sensitive tissues, and any tubes located in the mouth or nares.
- Avoid stimulating the gag reflex.
- Always perform a pre- and post-respiratory assessment to monitor patient for improvement.
- Consider other possible causes of respiratory distress, such as pneumothorax, pulmonary edema, or equipment malfunction.
- If an abnormal side effect occurs (e.g., increased difficulty in breathing, hypoxia, discomfort, worsening vital signs, or bloody sputum), notify appropriate health care provider.

| STEPS   | ADDITIONAL INFORMATION  |
|---|---|
| 1. Assess patient need for suctioning (respiratory assessment for signs of hypoxia), risk for aspiration, and inability to protect own airway or clear secretions adequately, which may lead to upper airway obstruction. | <p>Baseline respiratory assessment, including an O<sub>2</sub> saturation level, can alert the health care provider to worsening condition.</p> <p>Signs and symptoms include obvious excessive secretions; weak, ineffective cough; drooling; gastric secretions or vomit in the mouth; or gurgling sounds with inspiration and expiration. Pooling of secretions may lead to obstruction of airway. Suctioning is required with alterations in oxygen levels and with increased secretions.</p> |
| 2. Explain to patient how the procedure will help clear out secretions and will only last a few seconds. If appropriate, encourage patient to cough.  | <p>This allows patient time to ask questions and increase compliance with the procedure. Minimizes fear and anxiety.</p> <p>Encourage the patient to cough to bring secretions from the lower airways to the upper airways.</p>   |
| 3. Position patient in semi-Fowler's position with head turned to the side.   | This facilitates ease of suctioning. Unconscious patients should be in the lateral position.  |

4. [Perform hand hygiene](#), gather supplies, and apply non-sterile gloves. Apply mask if a body fluid splash is likely to occur.



*Wash hands*



*Apply non-sterile gloves*

This prevents the transmission of microorganisms.

Supplies include a suction machine or suction connection, connection tubing, non-sterile gloves, yankauer, water and a sterile basin, mask, and clean towel.


Suctioning may cause splashing of body fluids.



5. Fill basin with water.

Water is used to clear connection tubing in between suction. Fill basin with enough water to clear the connection tubing at least three times.



*Fill sterile container with sterile water*

|  |  |
|--|--|
| <p>6. Attach one end of connection tubing to the suction machine and the other end to the yankauer.</p>  | <p>This prepares equipment to function effectively.</p>  <p><i>Suction container</i></p>                                    |
| <p>7. Turn on suction to the required level. Test function by covering hole on the yankauer with your thumb and suctioning up a small amount of water.</p> | <p>Suction levels for adults are 100-150 mmHg on wall suction and 10-15 mmHg on portable suction units. Always refer to hospital policy for suction levels.</p>  |
| <p>8. Remove patient's oxygen mask if present. Nasal prongs may be left in place. Place towel on patient's chest.</p>                                      | <p>Always be prepared to replace the oxygen if patient becomes short of breath or has decreased O<sub>2</sub> saturation levels.</p> <p>The towel prevents patient from coming in contact with secretions.</p> |

|   |   |
|---|---|
| <p>9. Insert yankauer catheter and apply suction by covering the thumb hole. Run catheter along gum line to the pharynx in a circular motion, keeping yankauer moving.</p> <p>Encourage patient to cough.</p> | <p>Movement prevents the catheter from suctioning to the oral mucosa and causing trauma to the tissues.</p>  <p><i>Insert yankauer and apply suction by covering the thumb hole</i></p> <p>Coughing helps move secretions from the lower airways to the upper airways.</p> <p>Apply suction for a maximum of 10 to 15 seconds. Allow patient to rest in between suction for 30 seconds to 1 minute.</p> |
| <p>10. If required, replace oxygen on patient and clear out suction catheter by placing yankauer in the basin of water.</p>   | <p>Replace oxygen to prevent or minimize hypoxia.</p>  <p><i>Clear suction tubing with water</i></p> <p>Clearing out the catheter prevents the connection tubing from plugging.</p>  |
| <p>11. Reassess and repeat oral suctioning if required.</p>   | <p>Compare pre- and post-suction assessments to determine if intervention was effective.</p>  |
| <p>12. Reassess respiratory status and O<sub>2</sub> saturation for improvements. Call for help if any abnormal signs and symptoms appear.</p>  | <p>This identifies positive response to suctioning procedure and provides objective measure of effectiveness.</p>   |
| <p>13. Ensure patient is in a comfortable position and call bell is within reach. Provide oral hygiene if required.</p>   | <p>This promotes patient comfort.</p>   |
| <p>14. Clean up supplies, remove gloves, and wash hands. Document procedure according to hospital policy.</p>   | <p>Cleanup prevents the transmission of microorganisms. Documentation provides accurate details of response to suctioning and clear communication among the health care team.</p>   |
| <p>Data source: Perry et al., 2014; Potter et al., 2010</p>   |   |

VIDEO 5.1

Watch the [Oral Suctioning](#) video by [Renée Anderson and Wendy McKenzie](#), Thompson Rivers University.

Critical Thinking Exercises

1. What is the purpose of oral suctioning? Name three types of patients at risk for airway obstruction or ineffective cough.
2. What is the rationale for encouraging the patient to cough before suctioning?

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## 5.9 Summary

Oxygen is essential to life. The main goal of oxygen therapy is to prevent hypoxemia, thereby preventing hypoxia that could result in tissue damage and cell death. Hypoxia, if caused by certain medical conditions, can be managed and prevented by oxygen therapy. In other instances, such as with anemia and decreased cardiac output, the effects of oxygen therapy will be limited.

Always follow the guiding principles of the oxygen therapy protocols of your local health authority to administer oxygen safely to manage hypoxia and prevent the side effects and hazards of oxygen therapy.

### Key Takeaways

- Understand the pathophysiological factors affecting the gas exchange of oxygen. Understanding how the respiratory system works is key to knowing how to prevent and manage hypoxia.
- Hypoxia is a medical emergency. Be aware of the signs and symptoms of hypoxia, and of patients who are at risk for hypoxia.
- Oxygen therapy is a medical intervention. Ensure correct patient, correct flow rate, and correct connection to oxygen source. Oxygen may be initiated in emergency situations without a physician's order.
- Care should be taken to avoid interruption of oxygen therapy in situations including ambulation or transport for procedures. If using a portable tank during transport or ambulation, ensure there is a sufficient reserve of oxygen.
- Oxygen is a medication and should be prescribed with a target saturation range.
- For adults, the recommended target range for oxygen saturation is 92% to 98%. Oxygen levels decrease slightly with age, especially in patients over 70 years. A saturation of 94% may be considered normal in a patient with heart failure or underlying lung disease.
- For most patients with COPD, the target oxygen saturation range is 88% to 92%.
- Be aware of the causes of hypoxemia and treatments related to managing and preventing hypoxia.
- Oxygen therapy has benefits and hazards. Be aware of how to handle the administration of oxygen safely and monitor for side effects.
- Contact the respiratory therapist in the health care agency with questions or concerns related to oxygen therapy.

## Additional Videos

### VIDEO 5.2

Watch the [Oropharyngeal Suctioning](#) video by [Renée Anderson and Wendy McKenzie](#), Thompson Rivers University.

## Suggested Online Resources

1. [British Columbia Institute of Technology \(BCIT\) / Canadian Association of Critical Care Nurses \(CACCN\): The oxygen supply and demand framework: A tool to support integrative learning](#). This article discusses oxygenation and perfusion in the body.
2. [Canadian Centre for Occupational Health and Safety](#). This website provides standards for the safe use of oxygen in the hospital and home.
3. [Canadian Thoracic Society: Canadian respiratory guidelines](#). This website provides Canadian guidelines related to respiratory conditions such as chronic obstructive pulmonary disease (COPD), asthma, bronchitis, infectious respiratory diseases, and sleep apnea, as well as home ventilation.
4. [College of Respiratory Therapists of Ontario: Oxygen therapy. Clinical best practice guidelines](#). This document reviews Canadian standards for the management of oxygen therapy. This resource provides information on oxygen equipment, describes how oxygen works in the body, lists oxygen guidelines according to Canadian law, and gives a review of hyperbaric oxygen therapy.
5. [Thorax: Guideline for emergency oxygen use in adult patients](#). This British journal article provides the most current evidence-based material related to oxygen therapy.
6. [Vancouver Coastal Health: Course catalogue registration system \(CCRS\)](#). This system offers over 600 online and classroom health-related courses from Vancouver Coastal Health, Providence Health Care, Fraser Health Authority, and Island Health. You must create an account to access this system of free courses (select the “New User” button).

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# Chapter 6. Non-Parenteral Medication Administration



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## 6.1 Introduction

The nurse is the health care professional who will administer medication. This chapter describes responsibilities related to nurses in the administration of all medications except parenteral (see [Chapter 7](#)). Medications can be administered by a variety of routes or methods, each determined by the different preparations of drugs that influence the absorption, distribution, metabolism, and excretion (pharmacokinetics) in the body. It is imperative that the appropriate form of a drug be administered.

Every medication has the potential to harm a patient. Nurses must be aware that:

- No medication is completely safe and absolutely free of nontherapeutic effects.
- Medication interactions are common in individuals taking many medications.
- When one medication modifies the action of another, a medication interaction occurs (Perry, Potter, & Ostendorf, 2014).

The nurse administering medication is responsible for ensuring full understanding of medication administration and its implications for patient safety.

### Learning Objectives

- Discuss steps for ensuring safe medication administration
- Discuss factors that contribute to medication errors
- List and discuss the seven rights of medication administration
- Outline procedures for administering medication safely via the following routes:
  - Mouth and gastric tube
  - Rectally and vaginally
  - Eyes, ears, and nose
  - Inhalation and topically
- Outline steps for teaching patient self-administration of medication



---

## 6.2 Safe Medication Administration

In the Institute of Medicine's often-cited book *To Err Is Human: Building a Safer Health System* (Kohn, Corrigan, & Donaldson, 2000), it is estimated that approximately 1.5-million preventable adverse drug events (ADEs) occur annually. The Joint Commission (TJC) defines medication errors as any preventable event that may cause inappropriate medication use or jeopardize patient safety (TJC, 2012).

Medication errors are the number-one error in health care (Centers for Disease Control [CDC], 2013). Safe and accurate medication administration is an important and potentially challenging nursing responsibility. Medication administration requires good decision-making skills and clinical judgment, and the nurse is responsible for ensuring full understanding of medication administration and its implications for patient safety.

Medication errors have a substantial impact on health care in Canada (Butt, 2010). When preparing and administering medication, and assessing patients after receiving medication, always follow agency policy to ensure safe practice. Review Table 6.1 for guidelines for safe medication administration.

**Table 6.1 Guidelines for Safe Medication Administration**

| <i>Safety Considerations:</i>   |   |
|---|---|
| <ul style="list-style-type: none"> <li>Agency policy on medication administration and medication administration record (MAR) may vary. Always receive the required training on the use of the medication system for each agency to avoid preventable errors.</li> </ul> |   |
| PRINCIPLE   | ADDITIONAL INFORMATION  |
| Be vigilant when preparing medications.   | Avoid distractions. Some agencies have a <b>no-interruption zone (NIZ)</b> , where health care providers can prepare medications without interruptions.   |
| Check for allergies.  | Always ask patient about allergies, types of reactions, and severity of reactions.  |
| Use two patient identifiers at all times. Always follow agency policy for patient identification.   | Use at least two patient identifiers before administration <i>and</i> compare against the MAR.  |
| Assessment comes before medication administration.  | All medications require an assessment (review of lab values, pain, respiratory assessment, cardiac assessment, etc.) prior to medication administration to ensure the patient is receiving the correct medication for the correct reason.   |
| Be diligent in all medication calculations.   | Errors in medication calculations have contributed to dosage errors, especially when adjusting or titrating dosages.  |
| Avoid reliance on memory; use checklists and memory aids.   | Slips in memory are caused by lack of attention, fatigue, distractions. Mistakes are often referred to as attentional behaviours where lack of training or knowledge is the cause of the error. Slips account for most errors in health care. If possible, follow a standard list of steps for every patient. |
| Communicate with your patient before and after administration.  | Provide information to patient about the medication before administering it. Answer questions regarding usage, dose, and special considerations. Give the patient an opportunity to ask questions. Include family members if appropriate.   |
| Avoid workarounds.  | A <b>workaround</b> is a process that bypasses a procedure, policy, or problem in a system. For example, a nurse may “borrow” a medication from another patient while waiting for an order to be filled by the pharmacy. These workarounds fail to follow agency policy to ensure safe medication practices.  |
| Ensure medication has not expired.  | Medication may be inactive if expired.  |
| Always clarify an order or procedure that is unclear.   | Always ask for help whenever you are uncertain or unclear about an order. Consult with the pharmacist, charge nurse, or other health care providers and be sure to resolve all questions before proceeding with medication administration.  |

|  |  |
|--|--|
| Use available technology to administer medications.  | Bar-code scanning (eMAR) has decreased errors in administration by 51%, and computerized physician orders have decreased errors by 81%. Technology has the potential to help decrease errors. Use technology when administering medications but be aware of technology-induced errors.   |
| Report all near misses, errors, and adverse reactions.   | Reporting allows for analysis and identification of potential errors, which can lead to improvements and sharing of information for safer patient care.  |
| Be alert to error-prone situations and high-alert medications.   | <b>High-alert medications</b> are those that are most likely to cause significant harm, even when used as intended. The most common high-alert medications are anticoagulants, narcotics and opiates, insulins, and sedatives. The types of harm most commonly associated with these medications include hypotension, delirium, bleeding, hypoglycemia, bradycardia, and lethargy. |
| If a patient questions or expresses concern about a medication, stop and do not administer it.   | If a patient questions a medication, stop and explore the patient's concerns, review the physician's order, and, if necessary, notify the practitioner in charge of the patient.   |
| Data source: Agency for Healthcare Research and Quality, 2014; Canadian Patient Safety Institute, 2012; Debono et al., 2013; Institute for Healthcare Improvement, 2015; National Patient Safety Agency, 2009; National Priority Partnership, 2010; Prakash et al., 2014 |  |

## TECHNOLOGICAL ADVANCES THAT HELP MITIGATE MEDICATION ERRORS

Computerized physician order entry (CPOE) is a system that allows prescribers to electronically enter orders for medications, thus eliminating the need for written orders. CPOE increases the accuracy and legibility of medication orders; the potential for the integration of clinical decision support; and the optimization of prescriber, nurse, and pharmacist time (Agrawal, 2009). Decision support software integrated into a CPOE system can allow for the automatic checking of drug allergies, dosage indications, baseline laboratory results, and potential drug interactions. When a prescriber enters an order through CPOE, the information about the order will then transmit to the pharmacy and ultimately to the MAR.

The use of electronic bar codes on medication labels and packaging has the potential to improve patient safety in a number of ways. A patient's MAR is entered into the hospital's information system and encoded into the patient's wristband, which is accessible to the nurse through a handheld device. When administering a medication, the nurse scans the patient's medical record number on the wristband, and the bar code on the drug. The computer processes the scanned information, charts it, and updates the patient's MAR record appropriately (Poon et al., 2010).

Automated medication dispensing systems (AMDS) provide electronic automated control of all medications, including narcotics. Each nurse accessing the system has a unique access code. The nurse will enter the patient's name, the medication, the dosage, and the route of administration. The system will then open either the patient's individual drawer or the narcotic drawer to dispense the specific medication. If the patient's electronic health record is linked to the AMDS, the medication and the nurse who accessed the system will be linked to the patient's electronic record.

[Read the \*Top Ten Tips\* PDF](#) to review the importance of medication reconciliation.


Checklist 43 outlines the steps for safe medication administration.

**Checklist 43: Safe Medication Administration**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

- Plan medication administration to avoid disruption:
  - Dispense medication in a quiet area.
  - Avoid conversation with others.
  - Follow agency's no-interruption zone policy.
- Prepare medications for ONE patient at a time.
- Follow the SEVEN RIGHTS of medication preparation (see below).
- Check that the medication has not expired.
- [Perform hand hygiene](#).
- Check room for [additional precautions](#).
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth) AND check against MAR.
- Check allergy band for any allergies, and ask patient about type and severity of reaction.
- Complete necessary [focused assessments](#), lab values, and/or [vital signs](#), and document on MAR.
- Provide patient education as necessary.
- If a patient questions or expresses concern regarding a medication, stop and do not administer.

| STEPS                                 | ADDITIONAL INFORMATION  |
|---------------------------------------|---|
| 1. Check MAR against doctor's orders. | <p>Check that MAR and doctor's orders are consistent.</p>  <p><i>Compare physician orders and MAR</i></p> <p>Compare MAR with patient wristband.</p> <p>Night staff usually complete and verify this check as well.</p> |

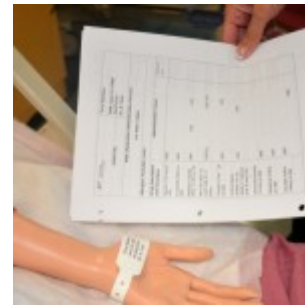
2. Perform the SEVEN RIGHTS x 3 (this must be done with each individual medication):

- The right patient
- The right medication (drug)
- The right dose
- The right route
- The right time
- The right reason
- The right documentation

Medication calculation:  $D/H \times S = A$

(**D** or desired dosage/**H** or have available x **S** or stock = **A** or amount prepared)

The right patient: check that you have the correct patient using two patient identifiers (e.g., name and date of birth).



*Compare MAR with patient wristband*

The right medication (drug): check that you have the correct medication and that it is appropriate for the patient in the current context.

The right dose: check that the dose makes sense for the age, size, and condition of the patient. Different dosages may be indicated for different conditions.

The right route: check that the route is appropriate for the patient's current condition.

The right time: adhere to the prescribed dose and schedule.



*Check the right patient, medication, dose, route, time, reason, documentation*

The right reason: check that the patient is receiving the medication for the appropriate reason.

The right documentation: always verify any unclear or inaccurate documentation prior to administering medications.

NEVER document that you have given a medication until you have actually administered it.

3. The label on the medication must be checked for name, dose, and route, and compared with the MAR at three different times:

1. When the medication is taken out of the drawer
2. When the medication is being poured
3. When the medication is being put away/or at bedside



*Perform seven checks three times before administering medication*

These checks are done before administering the medication to your patient.

If taking the drug to the bedside (e.g., eye drops), do a third check at the bedside.

4. Circle medication when poured.

Pour medication. Circle MAR to show that medication has been poured.



*Circle medication once it has been poured*


5. Positioning:

- Position patient appropriately for medication administration.
- Ensure proper body mechanics for health care provider.
- Position patient safely and appropriately once medication is administered.

This ensures patient safety and comfort.



*Position patient appropriately for medication administration*

|  |   |
|--|---|
| <p>6. Post-medication safety check:</p> <ul style="list-style-type: none"><li>• Complete post assessment and/or vital signs (if applicable).</li><li>• Sign MAR; place in the appropriate chart.</li><li>• <a href="#">Perform hand hygiene.</a></li></ul> | <p>This ensures patient safety.</p> <p>This step prevents the transfer of microorganisms.</p>  <p><i>Hand hygiene with ABHR</i></p> |
| <p>Data source: Lilley, Harrington, Snyder, &amp; Swart, 2011; Lynn, 2011; Perry et al., 2014</p>  |   |

Critical Thinking Exercises

1. Discuss why you think medication reconciliation is important for patient safety.
2. List five steps you can take to ensure safe medication administration practice.

---

## 6.3 Administering Medications by Mouth and Gastric Tube

### MEDICATION BY MOUTH

Medication is usually given orally, which is generally the most comfortable and convenient route for the patient. Medication given orally has a slower onset and a more prolonged, but less potent, effect than medication administered by other routes (Lynn, 2011).

Prior to oral administration of medications, ensure that the patient has no contraindications to receiving oral medication, is able to swallow, and is not on gastric suction. If the patient is having difficulty swallowing (dysphagia), some tablets may be crushed using a clean mortar and pestle for easier administration. Verify that a tablet may be crushed by consulting a drug reference or a pharmacist. Medications such as enteric-coated tablets, capsules, and sustained-release or long-acting drugs should never be crushed because doing so will affect the intended action of the medication. Tablets should be crushed one at a time and not mixed, so that it is possible to tell drugs apart if there is a spill. You may mix the medication in a small amount of soft food, such as applesauce or pudding.

Position the patient in a side-lying or upright position to decrease the risk of aspiration. Offer a glass of water or other oral fluid (that is not contraindicated with the medication) to ease swallowing and improve absorption and dissolution of the medication, taking any fluid restrictions into account.

Remain with the patient until all medication has been swallowed *before* signing that you administered the medication.

Checklist 44 outlines the steps for administering medication by mouth.

**Checklist 44: Administering Medication by Mouth**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

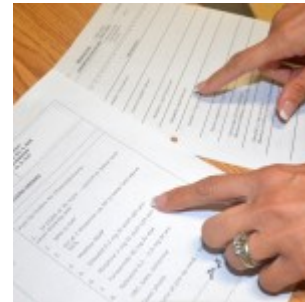
- [Perform hand hygiene](#).
- Check room for [additional precautions](#).
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Check allergy band for any allergies.
- Complete necessary [focused assessments](#) and/or [vital signs](#), and document on MAR.
- Provide patient education as necessary.
- Plan medication administration to avoid disruption:
  - Dispense medication in a quiet area.
  - Avoid conversation with others.
  - Follow agency’s no-interruption zone policy.
  - Prepare medications for ONE patient at a time.
  - Follow the SEVEN RIGHTS of medication administration.

**STEPS**

**ADDITIONAL INFORMATION**

1. Check MAR against doctor’s orders.

Check that MAR and doctor’s orders are consistent.



*Compare physician orders and MAR*

Night staff usually complete and verify this check as well.

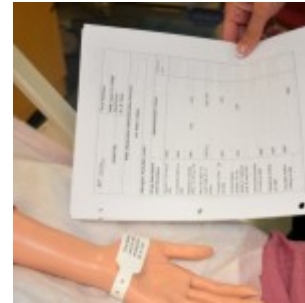
2. Perform the SEVEN RIGHTS x 3 (must be done with each individual medication):

- The right patient
- The right medication (drug)
- The right dose
- The right route
- The right time
- The right reason
- The right documentation

Medication calculation:  $D/H \times S = A$

(**D** or desired dosage/**H** or have available x **S** or stock = **A** or amount prepared)

The right patient: check that you have the correct patient using two patient identifiers (e.g., name and date of birth).



*Compare MAR with patient wristband*

The right medication (drug): check that you have the correct medication and that it is appropriate for the patient in the current context.

The right dose: check that the dose makes sense for the age, size, and condition of the patient. Different dosages may be indicated for different conditions.

The right route: check that the route is appropriate for the patient's current condition.

The right time: adhere to the prescribed dose and schedule.



The right reason: check that the patient is receiving the medication for the appropriate reason.


The right documentation: always verify any unclear or inaccurate documentation prior to administering medications.



*Check the right patient, medication, dose, route, time, reason, documentation*

**NEVER** document that you have given a medication until you have actually administered it.

|  |   |
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| <p>3. The label on the medication must be checked for name, dose, and route, and compared with the MAR at three different times:</p> <ol style="list-style-type: none"> <li>1. When the medication is taken out of the drawer</li> <li>2. When the medication is being poured</li> <li>3. When the medication is being put away/or at bedside</li> </ol> | <div style="text-align: center;">  <p><i>Perform seven checks three times before administering medication</i></p> </div> <p>These checks are done before administering the medication to your patient.</p> <p>If taking drug to bedside (e.g., eye drops), do third check at bedside.</p> |
| <p>4. Place all medications that patient will receive in one cup, except medications that require pre-assessment (e.g., blood pressure or pulse rate). Place these in a separate cup and keep wrapper intact.</p>  | <p>Keeping medications that require pre-assessment separately acts as a reminder and makes it easier to withhold medications if necessary.</p>  |
| <p>5. Do not touch medication with ungloved hands. Use clean gloved hands if it is necessary to touch the medication.</p>  | <p>Using gloves reduces contamination of the medication.</p>  |
| <p>6. Circle medication when poured.</p>   | <p>Pour medication. Circle MAR to show that medication has been poured.</p> <div style="text-align: center;">  <p><i>Circle medication once it has been poured</i></p> </div>   |
| <p>7. Patient education</p> <ul style="list-style-type: none"> <li>• Discuss purpose of each medication, action, and possible adverse effects.</li> <li>• Ask patient if they have any allergies.</li> </ul>   | <p>The patient has the right to be informed and provided with reasons for medication, action, and potential adverse effects. Giving this information will likely improve adherence to medication therapy and patient reporting of adverse effects.</p> <p>Confirms patient's allergy history.</p>   |
| <p><b>IMPORTANT:</b> If patient expresses concerns over medications, do not give medication. Verify doctor's order and explore patient concerns before administering medication.</p>   |   |

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| <p>8. Positioning</p> <ul style="list-style-type: none"> <li>• Help patient to sitting position. If patient is unable to sit, use the side-lying position.</li> <li>• Have patient stay in this position for 30 minutes after administering medication.</li> <li>• Offer patient water or desired oral fluid.</li> <li>• Ensure proper body mechanics for health care provider.</li> </ul>  |  <p><i>Position patient appropriately for medication administration</i></p> <p>Correct positioning reduces risk of aspiration during swallowing.</p> <p>Water or other oral fluids will help with swallowing of medication.</p> <p>Proper body mechanics reduces risk of injury to health care provider.</p> |
| <p>9. Administer medication orally as prescribed.</p> <ul style="list-style-type: none"> <li>• Tablets: place in mouth and swallow using water or other oral fluids.</li> <li>• Orally disintegrating medications: Remove carefully from packaging. Place medication on top of patient's tongue, and have patient avoid chewing the medication. Water is not needed.</li> <li>• Sublingually: Place medication under patient's tongue and allow to dissolve completely. Ensure patient avoids swallowing the medication.</li> <li>• Buccal: place medication in mouth and against inner cheek and gums and allow to dissolve completely.</li> <li>• Powdered medication: mix at bedside with water to avoid thickening of medication that may occur with time.</li> </ul> | <p>Follow any specific descriptions for administration of the medication.</p> <p>Wear gloves if placing the medication inside the patient's mouth.</p>   |

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| <p>10. Post-medication safety check</p> <ul style="list-style-type: none"> <li>• Stay with patient until all medications are swallowed or dissolved.</li> <li>• Perform post assessments and/or vital signs if applicable.</li> <li>• Sign MAR and place in appropriate chart.</li> <li>• <a href="#">Perform hand hygiene</a>.</li> <li>• Document any additional information, such as patient education, reasons why medication not administered, and adverse effects, as per agency policy.</li> </ul> | <p>Do not sign for any medications if you are not sure the patient has taken them.</p> <p>Post assessments determine effects and potential adverse effects of medications.</p> |
| <p>11. Return within appropriate time to evaluate patient's response to the medications and to check for possible adverse effects.</p> <p>If patient presents with any adverse effects:</p> <ul style="list-style-type: none"> <li>• Withhold further doses.</li> <li>• Assess vital signs.</li> <li>• Notify prescriber.</li> <li>• Notify pharmacy.</li> <li>• Document as per agency policy.</li> </ul>  | <p>Most sublingual medications act in 15 minutes, and most oral medications act in 30 minutes.</p>   |
| <p>Data source: BCIT, 2015; Lilley et al., 2011; Perry et al., 2014</p>   |  |

## MEDICATION VIA A GASTRIC TUBE

Patients with a gastric tube (nasogastric, nasointestinal, percutaneous endoscopic gastrostomy [PEG], or jejunostomy [J] tube) will often receive medication through this tube (Lynn, 2011). Liquid medications should always be used when possible because absorption is better and less likely to cause blockage of the tube. Certain solid forms of medication can be crushed and mixed with water prior to administration.

Checklist 45 outlines the steps for administering medication via a gastric tube.

**Checklist 45: Administering Medication via a Gastric Tube**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

**Safety considerations:**

- [Perform hand hygiene](#).
- Check room for [additional precautions](#).
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Check allergy band for any allergies.
- Complete necessary [focused assessments](#) and/or [vital signs](#), and document on MAR.
- Provide patient education as necessary.
- Plan medication administration to avoid disruption:
  - Dispense medication in a quiet area.
  - Avoid conversation with others.
  - Follow agency's no-interruption zone policy.
  - Prepare medications for ONE patient at a time.
  - Follow the SEVEN RIGHTS of medication administration.

**STEPS****ADDITIONAL INFORMATION**

1. Check MAR against doctor's orders.

Check that MAR and doctor's orders are consistent.



*Compare physician orders  
and MAR*

Night staff usually complete and verify this check as well.

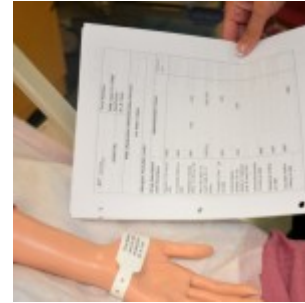
2. Perform the SEVEN RIGHTS x 3 (must be done with each individual medication):

- The right patient
- The right medication (drug)
- The right dose
- The right route
- The right time
- The right reason
- The right documentation

Medication calculation:  $D/H \times S = A$

(**D** or desired dosage/**H** or have available x **S** or stock = **A** or amount prepared)

The right patient: check that you have the correct patient using two patient identifiers (e.g., name and date of birth).



*Compare MAR with patient wristband*

The right medication (drug): check that you have the correct medication and that it is appropriate for the patient in the current context.

The right dose: check that the dose makes sense for the age, size, and condition of the patient. Different dosages may be indicated for different conditions.

The right route: check that the route is appropriate for the patient's current condition.

The right time: adhere to the prescribed dose and schedule.






*Check the right patient, medication, dose, route, time, reason, documentation*

The right reason: check that the patient is receiving the medication for the appropriate reason.

The right documentation: always verify any unclear or inaccurate documentation prior to administering medications.

NEVER document that you have given a medication until you have actually administered it.

|  |  |
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| <p>3. The label on the medication must be checked for name, dose, and route, and compared with the MAR at three different times:</p> <ol style="list-style-type: none"> <li>1. When the medication is taken out of the drawer</li> <li>2. When the medication is being poured</li> <li>3. When the medication is being put away/or at bedside</li> </ol> |  <p><i>Perform seven checks three times before administering medication</i></p> <p>These checks are done before administering the medication to your patient.</p> <p>If taking drug to bedside (e.g., eye drops), do third check at bedside.</p> |
| <p>4. Place all medications that patient will receive in one cup, except medications that require pre-assessment (e.g., blood pressure or pulse rate). Place these in a separate cup and keep wrapper intact.</p>  | <p>Keeping medications that require pre-assessment separately acts as a reminder and makes it easier to withhold medications if necessary.</p>   |
| <p>5. Do not touch medication with ungloved hands. Use clean gloved hands if it is necessary to touch the medication.</p>  | <p>Use gloves to reduce contamination of medication.</p>   |
| <p>6. Circle medication when poured.</p>   | <p>Pour medication. Circle MAR to show that medication has been poured.</p>  <p><i>Circle medication once it has been poured</i></p>   |
| <p>7. Patient education:</p> <ul style="list-style-type: none"> <li>• Discuss purpose of each medication, action, and possible adverse effects.</li> <li>• Ask patient if he or she has any allergies.</li> </ul>  | <p>The patient has the right to be informed, and providing reasons for medication, actions, and potential adverse effects will likely improve adherence to medication therapy and patient reporting of adverse effects.</p> <p>Confirm patient's allergy history.</p>  |
| <p><b>IMPORTANT:</b> If patient expresses concern about medications, do not give medication. Verify doctor's order and explore patient concerns before administering medication.</p>   |  |

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| 8. Help patient to a high sitting position unless contraindicated.   | This position reduces risk of aspiration during swallowing.  |
| 9. Determine if medication should be given with or without food. If the medication is to be given on an empty stomach, the enteral feeding may need to be stopped from 30 minutes before until 30 minutes after the medication is given. | Follow specific medication guidelines to ensure adequate absorption and distribution of the medication.  |
| 10. Apply clean non-sterile gloves.  | Using gloves prevents spread of microorganisms.  |
| 11. Check gastric tube for correct placement as described in <a href="#">Chapter 10</a> .  | Ensure that tube is properly placed prior to administering medication to prevent aspiration.   |
| 12. Dilute medication in 15 to 30 ml of water.   | Dilution keeps the tube from blocking.   |
| 13. Remove plunger from a 60 ml gastric tube syringe and attach syringe to the end of the gastric tube while pinching the gastric tube.  | Make sure the tip of the syringe fits the end of the gastric tube.   |
| 14. Pour medication and water solution into the 60 ml syringe, release pinch, and allow fluid to drain slowly by gravity into the gastric tube.  | <p>If fluid does not drain by gravity, gentle pressure may be applied using the plunger of the syringe, but do not force the medication through the tube.</p>  <p><i>Administer diluted medication via gastric tube</i></p> |
| 15. Flush 10 ml of water between medications.  | This step prevents interactions between medications.   |
| 16. After the last medication has been given, flush the tube with 30 ml of water.  | Flushing prevents blocking of the tube.  |
| 17. Keep the patient in a high sitting position to prevent aspiration.   | This position prevents aspiration and encourages absorption of medication.   |

|   |   |
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| <p>18. Post-medication safety check:</p> <ul style="list-style-type: none"> <li>• Stay with patient until all medications are instilled.</li> <li>• Perform post assessments and/or vital signs if applicable.</li> <li>• Sign MAR and place in appropriate chart.</li> <li>• <a href="#">Perform hand hygiene</a>.</li> <li>• Document any additional information, such as patient education, reasons why medication not administered, adverse effects, as per agency policy.</li> </ul> | <p>Post assessments determine effects and potential adverse effects of medications.</p> |
| <p>19. Return within appropriate time frame to evaluate patient's response to the medications and to check for possible adverse effects.</p> <p>If patient presents with any adverse effects:</p> <ul style="list-style-type: none"> <li>• Withhold further doses.</li> <li>• Assess vital signs.</li> <li>• Notify prescriber.</li> <li>• Notify pharmacy.</li> <li>• Document as per agency policy.</li> </ul>  | <p>Evaluate patient for intended and adverse effects.</p>                               |
| <p>Data source: BCIT, 2015; Lilley et al., 2011; Perry et al., 2014</p>   |   |

### Critical Thinking Exercises

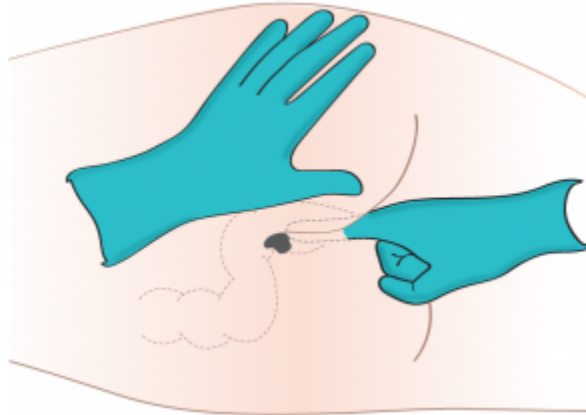
1. Your patient is dysphagic. Discuss the steps you should take and the considerations you should be cognizant of to administer oral medication safely.
2. Your patient is receiving medication and nutritional sustenance via an enteral gastric tube. The drug reference guide recommends that the medication you should administer be given without food. Discuss how you would approach this situation to ensure the safe administration of the medication.



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## 6.4 Administering Medications Rectally and Vaginally

### MEDICATION ADMINISTERED RECTALLY



*Figure 6.1 Administering medication rectally*

Drugs administered PR have a faster action than via the oral route and a higher bio-availability – that is, the amount of effective drug that is available is greater as it has not been influenced by upper gastrointestinal tract digestive processes. Rectal absorption results in more of the drug reaching the systemic circulation with less alteration on route. As well as being a more effective route for delivering medication, rectal administration also reduces side-effects of some drugs, such as gastric irritation, nausea and vomiting (Lowry, 2016, para 2). Rectal medications are given for their local effects in the gastrointestinal system (e.g., laxatives) or their systemic effects (e.g., analgesics when oral route is contraindicated). Rectal medications are contraindicated after rectal or bowel surgery, with rectal bleeding or prolapse, and with low platelet counts. Checklist 46 outlines the procedure for administering rectal suppositories or enemas.

**Checklist 46: Medication Administered Rectally**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

*Safety considerations:*

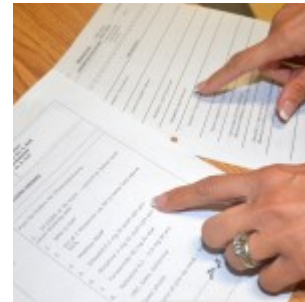
- [Perform hand hygiene](#).
- Check room for [additional precautions](#).
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Check allergy band for any allergies.
- Complete necessary [focused assessments](#) and/or [vital signs](#), and document on MAR.
- Provide patient education as necessary.
- Plan medication administration to avoid disruption:
  - Dispense medication in a quiet area.
  - Avoid conversation with others.
  - Follow agency’s no-interruption zone policy.
  - Prepare medications for ONE patient at a time.
  - Follow the SEVEN RIGHTS of medication administration.

**STEPS**

**ADDITIONAL INFORMATION**

1. Check MAR against doctor’s orders.

Check that MAR and doctor’s orders are consistent.



*Compare physician orders and MAR*

Night staff usually complete and verify this check as well.

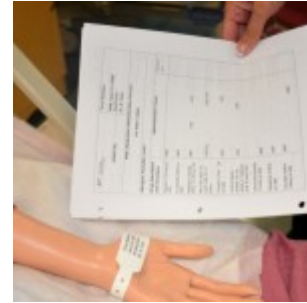
2. Perform the SEVEN RIGHTS x 3 (must be done with each individual medication):

- The right patient
- The right medication (drug)
- The right dose
- The right route
- The right time
- The right reason
- The right documentation

Medication calculation:  $D/H \times S = A$

(**D** or desired dosage/**H** or have available x **S** or stock = **A** or amount prepared)

The right patient: check that you have the correct patient using two patient identifiers (e.g., name and date of birth).



*Compare MAR with patient wristband*

The right medication (drug): check that you have the correct medication and that it is appropriate for the patient in the current context.

The right dose: check that the dose makes sense for the age, size, and condition of the patient. Different dosages may be indicated for different conditions.

The right route: check that the route is appropriate for the patient's current condition.

The right time: adhere to the prescribed dose and schedule.


The right reason: check that the patient is receiving the medication for the appropriate reason.




The right documentation: always verify any unclear or inaccurate documentation prior to administering medications.




*Check the right patient, medication, dose, route, time, reason, documentation*

**NEVER** document that you have given a medication until you have actually administered it.

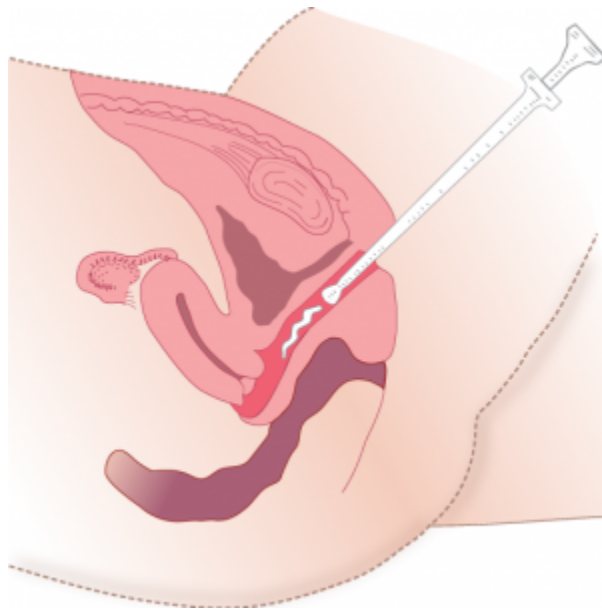
|  |   |
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| <p>3. The label on the medication must be checked for name, dose, and route, and compared with the MAR at three different times:</p> <ol style="list-style-type: none"> <li>1. When the medication is taken out of the drawer</li> <li>2. When the medication is being poured</li> <li>3. When the medication is being put away/or at bedside</li> </ol>   | <div style="text-align: center;">  <p><i>Perform seven checks three times before administering medication</i></p> </div> <p>These checks are done before administering the medication to your patient.</p> <p>If taking drug to bedside (e.g., eye drops), do third check at bedside.</p> |
| <p>4. If possible, have patient defecate prior to rectal medication administration.</p>  | <p>Medication should not be inserted into feces.</p>  |
| <p>5. Ensure that you have water-soluble lubricant available for medication administration.</p>  | <p>Lubricant reduces friction as suppository enters rectal canal.</p>   |
| <p>6. Explain the procedure to the patient. If patient prefers to self-administer the suppository/enema, give specific instructions to patient on correct procedure.</p>   | <p>Patient may feel more comfortable self-administering suppository.</p>  |
| <p><b>NOTE:</b> Unintended vagal stimulation may occur, resulting in bradycardia in some patients. Be aware that the rectal route may not be suitable for certain cardiac conditions. Notify physician.</p>  |   |
| <p>7. Raise bed to working height.</p> <ul style="list-style-type: none"> <li>• Position patient on left side with upper leg flexed over lower leg toward the waist (Sims position).</li> <li>• Provide privacy and drape the patient with only the buttocks and anal area exposed.</li> <li>• Place a drape underneath the patient's buttocks.</li> </ul> | <p>Positioning helps prevent injury to nurse administering medication. This protects patient's privacy and facilitates relaxation.</p> <p>Drape protects linens from potential fecal drainage.</p>  |

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| <p>8. Apply clean non-sterile gloves.</p>  | <p>Gloves protect the nurse from contact with mucous membranes and body fluids.</p>  <p><i>Apply non-sterile gloves</i></p>       |
| <p>9. Assess patient for diarrhea or active rectal bleeding.</p>   | <p>Rectal medications are contraindicated in these situations.</p>  |
| <p>10. Apply clean non-sterile gloves if previous gloves were soiled.</p>  | <p>Gloves protect the nurse from contact with mucous membranes and body fluids.</p>  <p><i>Apply non-sterile gloves</i></p>      |
| <p>11. Remove wrapper from suppository/tip of enema and lubricate rounded tip of suppository and index finger of dominant hand with lubricant.</p> <p>If enema, lubricate only tip of enema.</p> | <p>Lubricant reduces friction as suppository/enema enters rectal canal.</p>  <p><i>Lubricate rounded tip of suppository</i></p> |

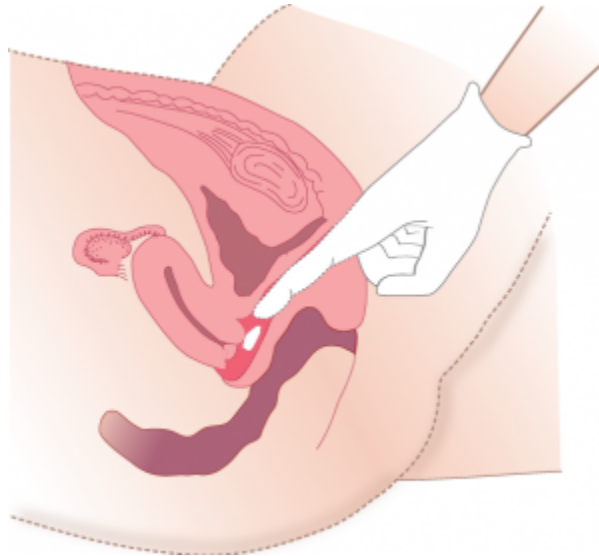
|   |  |
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| <p>12. Separate buttocks with non-dominant hand and, using gloved index finger of dominant hand, insert suppository (rounded tip toward patient) into rectum toward umbilicus while having patient take a deep breath, exhale through the mouth, and relax anal sphincter.</p> <p>If enema: Expel air from enema and then insert tip of enema into rectum toward umbilicus while having patient take a deep breath, exhale through the mouth, and relax anal sphincter.</p> | <p>You should feel the anal sphincter close around your finger after insertion. Forcing the suppository/enema through a clenched sphincter will cause pain and, potentially, rectal damage.</p>  |
| <p>13. With your gloved finger, insert suppository along wall of rectum about 5 cm beyond anal sphincter. Do not insert the suppository into feces.</p> <p>If enema: roll plastic bottle from bottom to tip until all solution has entered rectum and colon.</p>  | <p>Suppository should be against rectal mucosa for absorption and therapeutic action. Inserting suppository into feces will decrease its effectiveness.</p>  |
| <p>14. Option: A suppository may be given through a colostomy (not ileostomy) if prescribed.</p>  | <p>The patient should lie supine and a small amount of lubricant should be used.</p>   |
| <p>15. Remove finger and wipe patient’s anal area.</p>  | <p>Wiping removes excess lubricant and provides comfort to the patient.</p>  |
| <p>16. Ask patient to remain on side for 5 to 10 minutes.</p>   | <p>This position helps prevent the expulsion of suppository.</p>   |
| <p>17. Discard gloves by turning them inside out and disposing of them and any used supplies as per agency policy. <a href="#">Perform hand hygiene.</a></p>  | <p>Using gloves reduces transfer of microorganisms.</p> <div> </div> <p><i>Dispose of gloves</i></p> <div> </div> <p><i>Hand hygiene with ABHR</i></p> |

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| <p>18. Ensure call bell is nearby and bedpan/commode is available and close by.</p>                   | <p>If suppository is a laxative or stool softener, patient will require a bedpan/commode or close proximity to toilet.</p>  <p><i>Ensure call bell is available to patient</i></p> |
| <p>19. Document procedure as per agency policy and include patient's tolerance of administration.</p> | <p>Timely and accurate documentation promotes patient safety.</p>  |
| <p>Data source: BCIT, 2015; Lilley et al., 2011; Perry et al., 2014</p>                               |  |

## MEDICATION ADMINISTERED VAGINALLY



*Figure 6.2 Administering medication vaginally using an applicator*



*Figure 6.3 Administering medication vaginally without an applicator*

Female patients may require vaginal suppositories to treat vaginal infections. Vaginal suppositories are larger and more oval than rectal suppositories, and are inserted with an applicator (see Figure 6.2) or by hand (see Figure 6.3). Checklist 47 outlines the procedure for administering vaginal suppositories or medications.

**Checklist 47: Medication Administered Vaginally**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

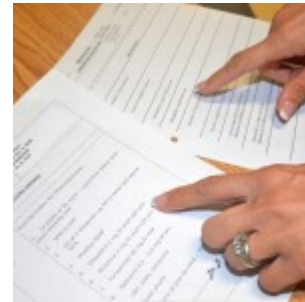
**Safety considerations:**

- [Perform hand hygiene](#).
- Check room for [additional precautions](#).
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Check allergy band for any allergies.
- Complete necessary [focused assessments](#) and/or [vital signs](#), and document on MAR.
- Provide patient education as necessary.
- Plan medication administration to avoid disruption:
  - Dispense medication in a quiet area.
  - Avoid conversation with others.
  - Follow agency's no-interruption zone policy.
  - Prepare medications for ONE patient at a time.
  - Follow the SEVEN RIGHTS of medication administration.

**STEPS****ADDITIONAL INFORMATION**

1. Check MAR against doctor's orders.

Students must check that MAR and doctor's orders are consistent.



*Compare physician orders and MAR*

Night staff usually complete and verify this check as well.

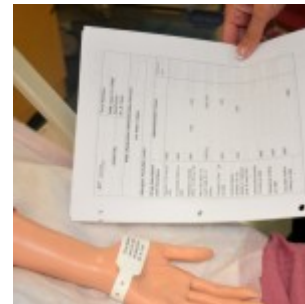
2. Perform the SEVEN RIGHTS x 3 (must be done with each individual medication):

- The right patient
- The right medication (drug)
- The right dose
- The right route
- The right time
- The right reason
- The right documentation

Medication calculation:  $D/H \times S = A$

(**D** or desired dosage/**H** or have available x **S** or stock = **A** or amount prepared)

The right patient: check that you have the correct patient using two patient identifiers (e.g., name and date of birth).



*Compare MAR with patient wristband*

The right medication (drug): check that you have the correct medication and that it is appropriate for the patient in the current context.

The right dose: check that the dose makes sense for the age, size, and condition of the patient. Different dosages may be indicated for different conditions.

The right route: check that the route is appropriate for the patient's current condition.

The right time: adhere to the prescribed dose and schedule.



The right reason: check that the patient is receiving the medication for the appropriate reason.




The right documentation: always verify any unclear or inaccurate documentation prior to administering medications.



*Check the right patient, medication, dose, route, time, reason, documentation*

**NEVER** document that you have given a medication until you have actually administered it.

|  |   |
|--|---|
| <p>3. The label on the medication must be checked for name, dose, and route, and compared with the MAR at three different times:</p> <ol style="list-style-type: none"> <li>1. When the medication is taken out of the drawer</li> <li>2. When the medication is being poured</li> <li>3. When the medication is being put away/or at bedside</li> </ol> |  <p><i>Perform seven checks three times before administering medication</i></p> <p>These checks are done before administering the medication to your patient. If taking drug to bedside (e.g., eye drops), do third check at bedside.</p> |
| <p>4. Before inserting the medication vaginally, explain the procedure to the patient. If patient prefers to self-administer the vaginal medication, give specific instructions to patient on correct procedure.</p>   | <p>Patient may feel more comfortable self-administering vaginal medication.</p>   |
| <p>5. Ensure that you have water-soluble lubricant available for medication administration.</p>  | <p>Lubricant reduces friction against vaginal mucosa as medication is inserted.</p>   |
| <p>6. Have patient void prior to procedure.</p>  | <p>Voiding prevents passing of urine during procedure.</p>  |
| <p>7. Raise bed to working height.</p> <ul style="list-style-type: none"> <li>• Position patient on back with legs slightly bent and feet flat on the bed.</li> <li>• Provide privacy, and drape patient so that vaginal area is exposed.</li> </ul>   | <p>Position helps prevent injury to nurse administering medication.</p> <p>Draping protects patient's privacy and facilitates relaxation.</p>   |
| <p>8. Apply clean non-sterile gloves.</p>  | <p>Gloves protect the nurse from contact with mucous membranes and body fluids.</p>  <p><i>Apply non-sterile gloves</i></p>   |

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| <p>9. Remove suppository from wrapper and apply a liberal amount of water-soluble lubricant to suppository and index finger of dominant hand. Suppository should be at room temperature.</p> | <p>Lubricant reduces friction against vaginal mucosa as medication is inserted.</p>  <p><i>Lubricate suppository</i></p>  |
| <p>10. With non-dominant hand, gently separate labial folds. With gloved index finger of dominant hand, insert lubricated suppository about 8 to 10 cm along posterior vagina wall.</p>      | <p>Exposes vaginal orifice and helps to ensure equal distribution of medication.</p>  |
| <p>11. Withdraw finger and wipe away excess lubricant.</p>   | <p>Wiping maintains patient comfort.</p>  |
| <p><b>NOTE:</b> An applicator may be used to insert vaginal medication. Follow procedure above and specific manufacturer directions.</p>   |   |
| <p>12. Discard gloves by turning them inside out and disposing of them and any used supplies as per agency policy. <a href="#">Perform hand hygiene.</a></p>                                 | <p>Using gloves reduces transfer of microorganisms.</p>  <p><i>Dispose of gloves</i></p>  <p><i>Hand hygiene with ABHR</i></p> |
| <p>13. Document procedure as per agency policy, and include patient's tolerance of administration.</p>   | <p>Timely and accurate documentation promotes patient safety.</p>   |
| <p>Data source: Lilley et al., 2011; Perry et al., 2014</p>  |   |

### Critical Thinking Exercises

1. Your patient has a colostomy, and a laxative has been prescribed. Discuss the procedure for administering a laxative in this situation.
2. Your patient prefers to self-administer her vaginal suppository. Outline the steps you would explain for safe and appropriate administration of a vaginal medication.



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## 6.5 Instilling Eye, Ear, and Nose Medications

### INSTILLING EYE MEDICATIONS

The eye is the most sensitive organ to which medication may be applied (Perry et al., 2014). The cornea is especially sensitive, making the conjunctival sac the appropriate site for instilling eye (ophthalmic) medications.

Checklist 48 outlines the steps for instilling eye medications.

### Checklist 48: Instilling Eye (Ophthalmic) Medications

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

**Safety considerations:**

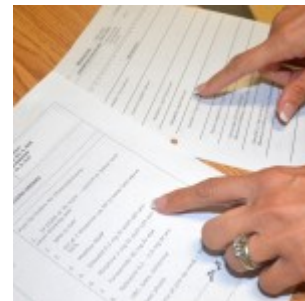
- [Perform hand hygiene](#).
- Check room for [additional precautions](#).
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Check allergy band for any allergies.
- Complete necessary [focused assessments](#) and/or [vital signs](#), and document on MAR.
- Provide patient education as necessary.
- Plan medication administration to avoid disruption:
  - Dispense medication in a quiet area.
  - Avoid conversation with others.
  - Follow agency’s no-interruption zone policy.
  - Prepare medications for ONE patient at a time.
  - Follow the SEVEN RIGHTS of medication administration.

**STEPS**

**ADDITIONAL INFORMATION**

1. Check MAR against doctor’s orders.

Check that MAR and doctor’s orders are consistent.



*Compare physician orders and MAR*

Night staff usually complete and verify this check as well.

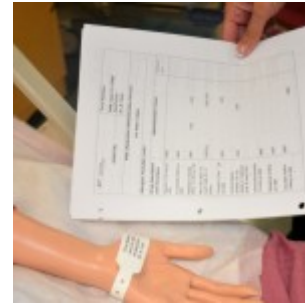
2. Perform the SEVEN RIGHTS  $\times 3$  (must be done with each individual medication):

- The right patient
- The right medication (drug)
- The right dose
- The right route
- The right time
- The right reason
- The right documentation

Medication calculation:  $D/H \times S = A$

(**D** or desired dosage/**H** or have available  $\times$  **S** or stock = **A** or amount prepared)

The right patient: check that you have the correct patient using two patient identifiers (e.g., name and date of birth).



*Compare MAR with patient wristband*

The right medication (drug): check that you have the correct medication and that it is appropriate for the patient in the current context.

The right dose: check that the dose makes sense for the age, size, and condition of the patient. Different dosages may be indicated for different conditions.

The right route: check that the route is appropriate for the patient's current condition.

The right time: adhere to the prescribed dose and schedule.



The right reason: check that the patient is receiving the medication for the appropriate reason.

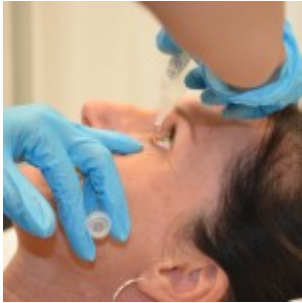


The right documentation: always verify any unclear or inaccurate documentation prior to administering medications.




*Check the right patient, medication, dose, route, time, reason, documentation*

**NEVER** document that you have given a medication until you have actually administered it.

|  |   |
|--|---|
| <p>3. The label on the medication must be checked for name, dose, and route, and compared with the MAR at three different times:</p> <ol style="list-style-type: none"> <li>1. When the medication is taken out of the drawer</li> <li>2. When the medication is being poured</li> <li>3. When the medication is being put away/or at bedside</li> </ol> | <div style="text-align: center;">  <p><i>Perform seven checks three times before administering medication</i></p> </div> <p>These checks are done before administering the medication to your patient.</p> <p>If taking drug to bedside (e.g., eye drops), do third check at bedside.</p> |
| <p>4. Before instilling eye medication, offer a tissue to the patient.</p>   | <p>Drops may spill from the eye with administration.</p>  |
| <p>5. Wear clean non-sterile gloves.</p>   | <p>Using gloves protects the nurse from potential contact with patient body fluids and medications.</p> <div style="text-align: center;">  <p><i>Apply non-sterile gloves</i></p> </div>   |
| <p>6. Cleanse the eyelashes and eyelids of any drainage or crusting with a warm washcloth or gauze. Use each area of cleaning surface only once and move from inner to outer eye area.</p>   | <p>Cleansing removes debris from eye area.</p>  |
| <p>7. Tilt patient's head back slightly if patient is sitting up, or place patient's head over a pillow (under the neck) if they are lying down.</p>   | <p>Tilting the head back makes it easier to reach the conjunctival sac for instilling drops.</p> <p>Do not tilt head back if patient has a cervical spine injury.</p>   |
| <p>8. Invert the eye-drop container and have patient look up and focus on something on the ceiling.</p>  | <p>Keeping the eye focused will help keep it still.</p>   |
| <p>9. Gently pull patient's lower lid down, using thumb or two fingers to expose conjunctival sac.</p>   | <p>Place eye drop in conjunctival sac, not directly on eyeball (cornea).</p>  |

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| <p>10. Eye drops: Hold eye-drop container above eye, taking care not to touch the eye, eyelids, or eyelashes. Instill one drop or more, if prescribed, into conjunctival sac.</p> <p>Eye ointment: Apply about 1.5 cm of ointment along conjunctival sac, moving from inner to outer canthus. Twist tube to break off ribbon of ointment.</p> | <p>Touching the tip of the container to anything can contaminate the medication.</p>  <p><i>Instill eye drops in left eye</i></p>        |
| <p>11. Release lower lid after instillation and ask patient to close eyes gently. Ask patient to move the eyeball while eyes are closed.</p>  | <p>This step allows the medication to be distributed across the eye.</p>  <p><i>Have patient close eyes after drop is instilled</i></p> |
| <p>12. Eye drops only: apply gentle pressure over inner canthus for 30 to 60 seconds to prevent medication from entering the lacrimal duct.</p>   | <p>This minimizes the systemic effects of the medication.</p>  |
| <p>13. Instruct patient not to rub eye.</p>   | <p>This is to prevent irritation and injury to the eye.</p>  |
| <p>14. Remove gloves and assist patient to a comfortable and safe position.</p>   | <p>This ensures patient safety and comfort.</p>  <p><i>Dispose of gloves</i></p>   |

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| <p>15. <a href="#">Perform hand hygiene.</a></p>   | <p>Hand hygiene prevents the spread of microorganisms.</p>  <p><i>Hand hygiene with ABHR</i></p> |
| <p>16. Document as per agency policy. Include date, time, dose, route; which eye the medication was instilled into; and patient's response to procedure.</p> | <p>Timely and accurate documentation helps to ensure patient safety.</p>   |
| <p>Data source: BCIT, 2015; Lilley et al., 2011; Perry et al., 2014</p>  |  |

## INSTILLING EAR MEDICATIONS

Internal ear structures are particularly sensitive to temperature extremes. Therefore, ear (otic) medications should always be administered at room temperature. Always use sterile ear drops in case the ear drum is ruptured.

Checklist 49 outlines the steps for instilling ear medications.

**Checklist 49: Instilling Ear (Otic) Medications**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

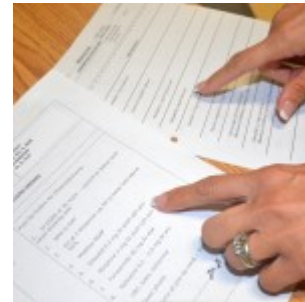
**Safety considerations:**

- [Perform hand hygiene](#).
- Check room for [additional precautions](#).
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Check allergy band for any allergies.
- Complete necessary [focused assessments](#) and/or [vital signs](#), and document on MAR.
- Provide patient education as necessary.
- Plan medication administration to avoid disruption:
  - Dispense medication in a quiet area.
  - Avoid conversation with others.
  - Follow agency's no-interruption zone policy.
  - Prepare medications for ONE patient at a time.
  - Follow the SEVEN RIGHTS of medication administration.

**STEPS****ADDITIONAL INFORMATION**

1. Check MAR against doctor's orders.

Check that MAR and doctor's orders are consistent.



*Compare physician orders  
and MAR*

Night staff usually complete and verify this check as well.

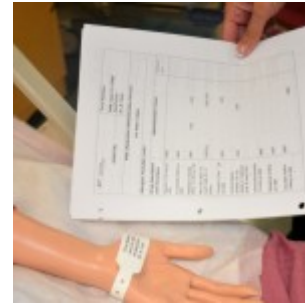
2. Perform the SEVEN RIGHTS x 3 (must be done with each individual medication):

- The right patient
- The right medication (drug)
- The right dose
- The right route
- The right time
- The right reason
- The right documentation

Medication calculation:  $D/H \times S = A$

(**D** or desired dosage/**H** or have available x **S** or stock = **A** or amount prepared)

The right patient: check that you have the correct patient using two patient identifiers (e.g., name and date of birth).



*Compare MAR with patient wristband*

The right medication (drug): check that you have the correct medication and that it is appropriate for the patient in the current context.

The right dose: check that the dose makes sense for the age, size, and condition of the patient. Different dosages may be indicated for different conditions.

The right route: check that the route is appropriate for the patient's current condition.

The right time: adhere to the prescribed dose and schedule.



The right reason: check that the patient is receiving the medication for the appropriate reason.



The right documentation: always verify any unclear or inaccurate documentation prior to administering medications.



*Check the right patient, medication, dose, route, time, reason, documentation*

**NEVER** document that you have given a medication until you have actually administered it.

|  |  |
|--|--|
| <p>3. The label on the medication must be checked for name, dose, and route, and compared with the MAR at three different times:</p> <ol style="list-style-type: none"> <li>1. When the medication is taken out of the drawer</li> <li>2. When the medication is being poured</li> <li>3. When the medication is being put away/or at bedside</li> </ol> |  <p><i>Perform seven checks three times before administering medication</i></p> <p>These checks are done before administering the medication to your patient.</p> <p>If taking drug to bedside (e.g., eye drops), do third check at bedside.</p> |
| <p>4. Before instilling ear drops, don clean non-sterile gloves.</p>   | <p>Using gloves protects the nurse from potential contact with patient body fluids and medications.</p>  <p><i>Apply non-sterile gloves</i></p>   |
| <p>5. Cleanse external ear of any drainage using a warm wet washcloth.</p>   | <p>Drainage or debris may prevent some medication from entering ear canal.</p>   |
| <p>6. Position patient with affected ear uppermost, on unaffected side if lying down, or tilt head to side if sitting up.</p>  | <p>Proper positioning helps to stop medication from escaping.</p> <p>Do not tilt head if patient has a cervical spine injury.</p>  |
| <p>7. Draw up medication into ear dropper, ensuring correct dosage.</p> <p>Do not return excess medication to stock bottle.</p>  | <p>Risk for contamination is increased if medication is returned to bottle.</p>  |

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| <p>8. Gently pull ear pinna back and up for an adult.</p>  | <p>Pulling the pinna straightens ear canal.</p>  <p><i>Pull the pinna to straighten ear canal</i></p> |
| <p>9. Hold dropper tip just above ear canal. Do not touch dropper tip to ear.</p>  | <p>Touching the ear with the dropper tip will contaminate the dropper and the medication.</p>   |
| <p>10. Allow drops to fall on the side of the ear canal.</p>   | <p>Dropping the drops directly into the canal and onto the tympanic membrane will cause the patient discomfort.</p>   |
| <p>11. Release ear pinna and have patient remain in the position for at least 5 minutes.</p>   | <p>This position prevents medication from escaping from ear.</p>  |
| <p>12. Apply gentle pressure to tragus several times.</p>  | <p>Pressure helps move medication toward tympanic membrane.</p>   |
| <p>13. If ordered, a cotton ball may be placed loosely in the ear canal.</p>   | <p>Cotton ball helps prevent medication from escaping from ear.</p>   |
| <p>14. Remove gloves and assist patient to a comfortable and safe position.</p>  | <p>This ensures patient safety and comfort.</p>   |
| <p>15. <a href="#">Perform hand hygiene.</a></p>   | <p>Hand hygiene prevents the spread of microorganisms.</p>  <p><i>Hand hygiene with ABHR</i></p>    |
| <p>16. Document as per agency policy. Include date, time, dose, route; which ear the medication was instilled into; and patient's response to procedure.</p> | <p>Timely and accurate documentation helps to ensure patient safety.</p>  |
| <p>Data source: BCIT, 2015; Lilley et al., 2011; Perry et al., 2014</p>  |   |

## INSTILLING NASAL MEDICATIONS

Nasal medications are instilled for the treatment of allergies, nasal congestion, and sinus infections.

The nose is not a sterile cavity, but medical asepsis must be observed because of its connection to the sinuses.

Checklist 50 outlines the steps for instilling nasal medications.

**Checklist 50: Instilling Nasal Medications**

*Disclaimer: Always review and follow your hospital policy regarding this specific skill.*

**Safety considerations:**

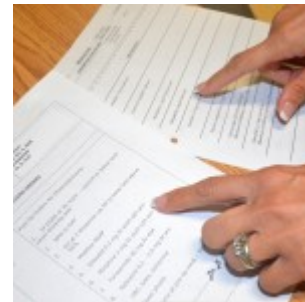
- [Perform hand hygiene](#).
- Check room for [additional precautions](#).
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth).
- Check allergy band for any allergies.
- Complete necessary [focused assessments](#) and/or [vital signs](#), and document on MAR.
- Provide patient education as necessary.
- Plan medication administration to avoid disruption:
  - Dispense medication in a quiet area.
  - Avoid conversation with others.
  - Follow agency’s no-interruption zone policy.
  - Prepare medications for ONE patient at a time.
  - Follow the SEVEN RIGHTS of medication administration.

**STEPS**

**ADDITIONAL INFORMATION**

1. Check MAR against doctor’s orders.

Check that MAR and doctor’s orders are consistent.



*Compare physician orders and MAR*

Night staff usually complete and verify this check as well.

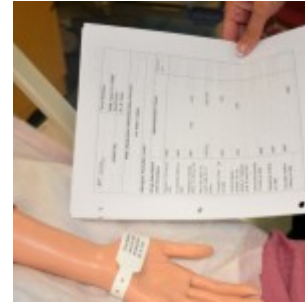
2. Perform the SEVEN RIGHTS x 3 (must be done with each individual medication):

- The right patient
- The right medication (drug)
- The right dose
- The right route
- The right time
- The right reason
- The right documentation

Medication calculation:  $D/H \times S = A$

(**D** or desired dosage/**H** or have available x **S** or stock = **A** or amount prepared)

The right patient: check that you have the correct patient using two patient identifiers (e.g., name and date of birth).



*Compare MAR with patient wristband*

The right medication (drug): check that you have the correct medication and that it is appropriate for the patient in the current context.

The right dose: check that the dose makes sense for the age, size, and condition of the patient. Different dosages may be indicated for different conditions.

The right route: check that the route is appropriate for the patient's current condition.

The right time: adhere to the prescribed dose and schedule.

The right reason: check that the patient is receiving the medication for the appropriate reason.

The right documentation: always verify any unclear or inaccurate documentation prior to administering medications.



*Check the right patient, medication, dose, route, time, reason, documentation*

**NEVER** document that you have given a medication until you have actually administered it.