

Isolation Precautions: Personal Protective Equipment

Extended Text

ALERT

Don a gown that is impervious to moisture when there is a risk for excess soiling.³

Wash hands or use an alcohol-based hand rub (ABHR) immediately after removing all personal protective equipment (PPE).³

Place patients who require airborne isolation in a negative-pressure airborne infection isolation room (AIIR).³

OVERVIEW

When a patient has a known or suspected source of colonization or infection, health care personnel must follow specific infection prevention and control practices to reduce the risk of cross-contamination to other patients and health care personnel. Body substances (e.g., feces, urine, mucus, wound drainage) contain potentially infectious organisms. Isolation or barrier precautions include the appropriate use of PPE, such as a gown, mask, eye protection, and gloves. Health care personnel must assess the need for barrier precautions for each planned task and for each patient, regardless of the diagnoses. Increased attention to the prevention of blood-borne pathogens and airborne pathogens, such as tuberculosis (TB), has led to the stressed importance of barrier protection.

Published guidelines for isolation precautions contain recommendations based on current epidemiologic information regarding disease transmission in health care settings. Although primarily intended for patients in acute care, these recommendations can be applied to patients in subacute care or long-term care facilities. Organizations should modify the recommendations based on their specific needs and as dictated by federal, state, or local regulations.³

Standard precautions, or tier one precautions, pertain to all patients regardless of the risk or presumed infection status ([Box 1](#)).³ Standard precautions are the primary strategies for preventing infection transmission and apply to contact with blood, body fluids, nonintact skin, and mucous membranes, as well as equipment or surfaces contaminated with potentially infectious materials. The strategy for respiratory hygiene and cough etiquette applies to any person with signs of respiratory infection (i.e., cough, congestion, rhinorrhea, increased production of respiratory secretions) when entering a health care facility. Key elements of respiratory hygiene education for health care personnel, patients, and visitors include covering the mouth and nose with a tissue when coughing and properly discarding used tissues.

The second tier includes transmission-based precautions designed for the care of a patient who is known or suspected to be infected, or colonized, with microorganisms ([Box 1](#)).³ Organisms may be transmitted by contact, droplet, or airborne route or by

contact with contaminated surfaces. The three types of transmission-based precautions—airborne, droplet, and contact—may be combined for diseases that have multiple routes of transmission (e.g., chickenpox) (Box 1).³ Whether used singly or in combination, the precautions should be employed in conjunction with standard precautions.

It is important to remember that a patient may experience loneliness if he or she requires isolation in a private room. Isolation disrupts normal social relationships with visitors and caregivers. Some patients who suffer from an infectious disease also experience self-concept or body image changes.

Box 1	Centers for Disease Control and Prevention Isolation Guidelines Standard Precautions (Tier One) for Use with All Patients
	<ul style="list-style-type: none"> • Standard precautions apply to blood, blood products, all body fluids, secretions, excretions (except sweat), nonintact skin, and mucous membranes. • Perform hand hygiene before, after, and between direct contact with patients. (Examples of between-contact activities are cleaning hands after a patient care activity, moving to a non-patient care activity, and cleaning hands again before returning to perform patient contact). • Perform hand hygiene after contact with blood, body fluids, mucous membranes, nonintact skin, secretions, excretions, or wound dressings; after contact with inanimate surfaces or articles in a patient room; and immediately after gloves are removed. • When hands are visibly soiled or contaminated with blood or body fluids, wash them with either a nonantimicrobial soap or an antimicrobial soap and water. • When hands are not visibly soiled or contaminated with blood or body fluids, use an alcohol-based hand rub to perform hand hygiene. • Wash hands with nonantimicrobial soap and water if contact with spores (e.g., <i>Clostridium difficile</i>) is likely to have occurred. • Do not wear artificial fingernails or extenders if duties include direct contact with patients at high risk for infection and associated adverse outcomes. • Wear gloves when touching blood, body fluids, secretions, excretions, nonintact skin, mucous membranes, or contaminated items or surfaces is likely. Remove gloves and perform hand hygiene between patient care encounters and when going from a contaminated to a clean body site. • Wear personal protective equipment (PPE) when the anticipated patient interaction indicates that contact with blood or body fluids may occur. • A private room is unnecessary unless the patient's hygiene is unacceptable (e.g., uncontained secretions, excretions, or wound drainage). • Discard all contaminated sharp instruments and needles in a puncture-resistant container. Health care agencies must make available needleless devices. Any needles should be disposed of uncapped, or a mechanical safety device must be activated for recapping. • Respiratory hygiene/cough etiquette—have patients: <ul style="list-style-type: none"> ○ Cover the nose/mouth when coughing or sneezing. ○ Use tissues to contain respiratory secretions and dispose in nearest waste container. ○ Perform hand hygiene after contacting respiratory secretions and contaminated objects or materials. ○ Contain respiratory secretions with procedure or surgical mask. ○ Sit at least 91.4 cm (3 feet) away from others if coughing.

Transmission-Based Precautions (Tier Two) for Use with Specific Types of Patients

Category

- Airborne precautions (droplet nuclei smaller than 5 microns)
- Droplet precautions (droplets larger than 5 microns; being within 3 feet of patient)
- Contact precautions (direct patient or environmental contact)
- Protective environment

Infection/Condition

- Measles, chickenpox (varicella), disseminated varicella zoster, pulmonary or laryngeal tuberculosis
- Diphtheria (pharyngeal), rubella, streptococcal pharyngitis, pneumonia or scarlet fever in infants and young children, pertussis, mumps, *Mycoplasma pneumoniae*, meningococcal pneumonia or sepsis, pneumonic plague
- Colonization or infection with multidrug-resistant organisms, such as VRE and MRSA, *Clostridium difficile*, shigella, and other enteric pathogens; major wound infections; herpes simplex; scabies; varicella zoster (disseminated); respiratory syncytial virus in infants, young children, or immunocompromised adults
- Allogeneic hematopoietic stem cell transplants

Barrier Protection

- Private room, negative-pressure airflow of at least 6 to 12 exchanges per hour via HEPA filtration; mask or respiratory protection device, N95 respirator (depending on condition)
- Private room or cohort patients; mask or respirator (refer to agency policy)
- Private room or cohort patients (see agency policy), gloves, gowns; patients may leave their room for procedures or therapy if infectious material is contained or covered and placed in a clean gown and hands cleaned
- Private room; positive airflow with ≥ 12 air exchanges per hour; HEPA filtration for incoming air; mask to be worn by patient when out of room during times of construction in area

HEPA, high-efficiency particulate air; MRSA, methicillin-resistant *Staphylococcus aureus*; VRE, vancomycin-resistant enterococcus

(Modified from Centers for Disease Control and Prevention [CDC]. [2007]. Hospital Infection Control Practices Advisory Committee: Guidelines for isolation precautions in hospitals. *MMWR Morbidity and Mortality Weekly Report*, 57/RR-16, 39.)

SUPPLIES

[Click here for a list of supplies.](#)

PATIENT AND FAMILY EDUCATION

- Explain the purpose of the isolation to the patient and family.
- Instruct the family on precautions to take when entering an isolation room.
- Demonstrate to the family how to put on and take off the PPE.
- Teach the patient and family appropriate use of barrier techniques for home care.
- Encourage questions and answer them as they arise.

ASSESSMENT AND PREPARATION

Assessment

1. Review the patient's medical history for possible indications of isolation, such as risk factors for TB, a major draining wound, diarrhea, or a purulent productive cough.
2. Review the precautions for the specific isolation criteria, including appropriate PPE to apply ([Box 1](#)).
3. Review the patient's laboratory test results.
4. Determine whether the patient has a known latex allergy.
5. Consider the types of care to be performed while in the patient's room (e.g., medication administration, dressing change).
6. Review the patient's medical record or confer with colleagues regarding the patient's emotional state and reaction and adjustment to isolation.
7. Determine if the patient needs to be moved to a negative-pressure AIIR.

Preparation

1. Provide proper equipment access and signage as needed.
2. Prevent extra trips in and out of the room; gather all needed equipment and supplies before entering the room.
3. Provide dedicated medical equipment (i.e., stethoscope, blood pressure cuff, and thermometer) in the room.³
4. Choose a barrier protection that is appropriate for the type of isolation used and the organization's practice ([Box 1](#)).
 - a. Contact precautions: Standard precautions plus gloves and gown
 - b. Droplet precautions: Standard precautions plus a mask
 - c. Airborne precautions: Standard precautions plus a N95 respirator or powered air-purifying respirator (PAPR)
 - d. Face protection (e.g., goggles, face shield): Chosen for specific situations and anticipated circumstances of exposure

PROCEDURE

1. Perform hand hygiene.
2. Don a gown.
 - a. Ensure that the gown covers the torso from the neck to the knees and from the arms to the end of the wrists and that it wraps around the back.
 - b. Pull the sleeves of the gown down to the wrist.
 - c. Fasten the gown securely at the back of the neck and the waist.

Rationale: Donning a gown properly prevents the transmission of infection and provides protection if the patient has excessive drainage or discharge.

3. Don either a surgical mask or a fitted N95 respirator around the mouth and nose.
 - a. Secure the ties or elastics at the middle of the head and neck or the elastic ear loops around the ears.
 - b. Fit the flexible band to the nose bridge.
 - c. Ensure that the mask fits snugly on the face and below the chin.
 - d. If using a PAPR, follow the manufacturer's instructions.

Rationale: Donning the correct mask properly reduces the risk of exposure to airborne microorganisms or exposure to microorganisms from splashing fluids.

4. Don eye protection (goggles or face shield), if needed, around the face and eyes. Adjust to fit.

Rationale: Donning eye protection properly reduces the risk of exposure to microorganisms that may occur from splashing fluids.

5. Don gloves, bringing the glove cuffs over the edge of the gown sleeves .
6. Enter the patient's room and arrange the supplies and equipment.
7. Introduce yourself to the patient.
8. Verify the correct patient using two identifiers.
9. Provide designated care to the patient while maintaining precautions.
 - a. Keep your hands away from your face.
 - b. Limit touching surfaces in the room.
 - c. Remove gloves when torn or heavily contaminated, perform hand hygiene, and don a new pair of gloves.
10. Administer medications while maintaining precautions as ordered.
 - a. Provide oral medication in a wrapper or cup and then discard the wrapper or cup in the proper trash receptacle.

Rationale: Single-use medication containers minimize the transfer of microorganisms.

- b. Wear gloves when administering injections.

Rationale: Gloves act as a barrier to reduce the risk of exposure to blood.

- c. Discard disposable syringes and uncapped or sheathed needles in the proper sharps receptacle.

Rationale: Properly disposing of sharps reduces the risk of a needlestick injury.

- d. Place the reusable plastic syringe holder, if used, on a towel for eventual removal and disinfection.
11. Assist the patient with hygiene, encouraging him or her to ask questions or express concerns about the isolation. Provide informal teaching at this time to ensure that the patient understands the purpose of the isolation.

Rationale: Hygiene practices further minimize the transfer of microorganisms. Assisting the patient with hygiene provides quality time with the patient and an opportunity to reinforce patient education.

Avoid allowing the isolation gown to become wet. Carry the wash basin outward, away from the gown, and do not lean against a wet tabletop.

Rationale: Moisture allows organisms to travel through the gown to the uniform underneath.

- a. Help the patient remove his or her gown and place it in an impervious linen bag.

Rationale: An impervious linen bag reduces the transfer of microorganisms.

- b. Remove the linen from the bed, avoiding contact with the isolation gown. Place the soiled linen in an impervious linen bag.

Rationale: Linens soiled with the patient's body fluids must be kept from contacting clean items.

- c. Provide clean bed linen and a set of towels.
- d. If gloves become excessively soiled and further care is necessary, remove gloves, perform hand hygiene, and don new gloves.

12. Collect any ordered specimens.

- a. In the presence of the patient, label the specimen per the organization's practice.²
- b. Prepare the specimen for transport.
 - i. Place the labeled specimen in a biohazard bag.
 - ii. If the specimen requires ice for transport, place the specimen in a biohazard bag and then place the bag with the specimen into a second biohazard bag filled with ice slurry.

Rationale: Placing the specimen in a separate bag protects the label from being damaged.

13. Discard linen, trash, and disposable items.

- a. Use single bags that are sturdy and impervious to moisture to contain soiled articles. Double-bag heavily soiled linen or heavy, wet trash if necessary.

Ensure that linens or refuse are totally contained to protect personnel from exposure to infectious organisms.

- b. Tie the bags securely at the top with a knot.

14. Remove all reusable pieces of equipment and thoroughly disinfect reusable equipment brought into the room. Ensure that equipment is disinfected with an organization-approved disinfectant when it is removed from the room and before use on another patient.

Rationale: Disinfecting equipment after use decreases the risk of infection transmission. Using equipment that is dedicated only for use with the patient on isolation precautions further minimizes this risk.³

15. Resupply the room as needed. Have other health care personnel hand in new supplies, if needed.

Rationale: Limiting trips in and out of the room reduces exposure of the patient and health care personnel to microorganisms.

16. Remove PPE before exiting the patient room except for the N95 respirator or PAPR (if worn). Remove the N95 respirator or PAPR after leaving the patient's room and closing the door.

Option 1: Removal of PPE, if using a nondisposable or disposable gown

- a. Remove gloves.

If hands become contaminated during glove removal, immediately wash hands or use an ABHR.

- i. Using a gloved hand, grasp the palm area of the other gloved hand and peel off the first glove.
- ii. Hold the removed glove in the gloved hand.
- iii. Slide the fingers of the ungloved hand under the remaining glove at the wrist.
- iv. Peel the second glove off over the first glove.

Rationale: Properly removing gloves prevents contact with the contaminated gloves' outer surface.

- b. Discard gloves in the proper container.
- c. Remove eye protection from the back by lifting the head band or ear pieces.
- d. Discard eye protection in the proper container or place in an appropriate container for disinfection.

Rationale: The outside of the eye protection is contaminated. Handling as described allows removal without contaminating hands.

- e. Remove gown.
 - i. Unfasten the gown's neck ties and waist ties, taking care that the sleeves do not make contact with the body when reaching for the ties.
 - ii. Pull the gown away from the neck and shoulders, touching the inside of the gown only.
 - iii. Turn the gown inside-out and fold it into a bundle.

Rationale: The front of the gown and sleeves are contaminated. Removing the gown as described prevents contact with the contaminated front of the gown.

- f. Place the gown in a laundry bag or discard disposable gown in the proper container.

- g. Remove mask. Remove the elastic from the ears and pull the mask away from the face or grasp the bottom ties or elastics and then the top ties or elastics and pull the mask away from the face.

Do not touch the outer surface of the mask.

Rationale: The front of the mask is contaminated. Touching only the elastic or mask strings protects ungloved hands from contamination. Untying the bottom mask string first prevents the top part of the mask from falling down over the health care team member's uniform.

- h. Discard the mask in the proper container.

Option 2: Removal of PPE, if using a disposable gown

- a. Remove gown and gloves.

If hands become contaminated during glove removal, immediately wash hands or use an ABHR.

- i. Grasp the gown in the front and pull away from the body so that the ties break, touching the outside of the gown only with gloved hands.
- ii. While removing the gown, fold or roll it inside-out into a bundle, peeling off the gloves at the same time, only touching the inside of the gloves and gown with bare hands.

Rationale: The front of the gown and sleeves are contaminated. Removing the gown as described prevents contact with the contaminated front of the gown.

- b. Discard the gown in the proper container.
- c. Remove eye protection from the back by lifting the head band or ear pieces.
- d. Discard eye protection in the proper container or place in an appropriate container for disinfection.

Rationale: The outside of the eye protection is contaminated. Handling as described allows removal without contaminating hands.

- e. Remove mask. Remove the elastic from the ears and pull the mask away from the face or grasp the bottom ties or elastics and then the top ties or elastics and pull the mask away from the face.

Do not touch the outer surface of the mask.

Rationale: The front of the mask is contaminated. Touching only the elastic or mask strings protects ungloved hands from contamination. Untying the bottom mask string first prevents the top part of the mask from falling down over the health care team member's uniform.

- f. Discard the mask in the proper container.

17. Perform hand hygiene.

18. Inform the patient when you plan to return to the room. Ask whether the patient requires any personal care items.

19. Leave the room and close the door, if the patient is in a negative-pressure AIIR.
20. If the patient is in airborne isolation, remove the N95 respirator or PAPR.

- a. To remove the mask, grasp the bottom ties or elastics and then the top ties or elastics and pull the mask away from the face.

Do not touch the outer surface of the mask.

Rationale: The front of the mask is contaminated. Touching only the elastic or mask strings protects ungloved hands from contamination. Untying the bottom mask string first prevents the top part of the mask from falling down over the health care team member's uniform.

- b. If the patient is on contact and airborne isolation, discard the N95 respirator in the proper container.

Rationale: Humidity, dirt, and crushing reduce the efficiency of the mask.

- c. Place the reusable N95 respirator in a labeled paper bag for reuse by the same person. N95 respirators can be reused when supplies are limited (e.g., influenza pandemics or widespread outbreaks of other respiratory illnesses).¹

Rationale: Reusable storage bags keep equipment contaminant free and should be labeled to prevent more than one person from wearing the mask. A damaged or crushed mask may not seal properly.

Use caution not to crush the mask. Do not leave the mask hanging around the neck.

- d. Remove, disinfect, and store the PAPR according to the manufacturer's instructions.
- e. Perform hand hygiene.

21. Immediately transport the specimen to the laboratory.
22. Document the procedure in the patient's record.

MONITORING AND CARE

1. Ensure that the patient has had sufficient opportunity to discuss health problems, course of treatment, or other topics important to him or her while in the isolation room.
2. Continually monitor the patient's and family's understanding of ongoing isolation. Offer opportunities for them to ask questions.
3. Monitor the patient for loneliness or boredom and for signs and symptoms of depression (e.g., lack of appetite, difficulty sleeping).

Rationale: Monitoring for loneliness, boredom, and depression allows for complications from isolation to be identified and for intervention.

4. Assess, treat, and reassess pain.

EXPECTED OUTCOMES

- Patient spontaneously engages in discussions with the health care team member and family.
- Patient asks for information about disease transmission.
- Patient explains the purpose of isolation and cooperates with precautions.

UNEXPECTED OUTCOMES

- Patient avoids social and therapeutic discussions.
- Patient does not cooperate with precautions.

DOCUMENTATION

- Patient and family education
- Procedures performed
- Patient's response to social isolation
- Evidenced or suspected breach of isolation precautions
- Unexpected outcomes and related nursing interventions

PEDIATRIC CONSIDERATIONS

- Isolation creates a sense of separation from family and a loss of control. A strange environment may add to any confusion the child feels during isolation. A preschool-age child is unable to understand the cause and effect relationship for isolation. Older children may be able to understand the cause, but they still may be frightened.
- A child requires simple explanations, for example, "You need to be in this room to help you get better."
- Ensure that the child's family is actively involved in any explanations.
- All barrier precautions should be shown to the child. Health care personnel should let the child see their faces before applying the mask so that the child does not become frightened.

GERONTOLOGICAL CONSIDERATIONS

- Isolation can be a concern for older adults, especially those who have signs and symptoms of confusion or depression. Many older adults become confused when they are confronted with a health care team member using barrier precautions or when left in a room with the door closed. The need for closing the door (negative-pressure AIIR), along with the patient's safety and additional safety measures, should be assessed.
- Older adults should be assessed for signs of depression, such as loss of appetite or a decrease in verbal communication. If necessary, the health care team should be consulted for appropriate interventions.

HOME CARE CONSIDERATIONS

- Although isolation precautions followed in a health care facility are not directly applicable to home care, caregivers should be aware of potential sources of contamination in the home.

Supplies

- Impervious linen bag and trash receptacles
- PPE (gloves [latex free if needed], mask, eye protection, and disposable or reusable gown [as needed for specific type of isolation employed])
- Other patient care equipment as appropriate (e.g., personal hygiene items, medications, dressing change supplies, specimen collection containers)
- Sign for door indicating type of isolation, required PPE, and instructions for visitors

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REFERENCES

Levels of Evidence

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ADDITIONAL READING

None

