[**INFECTION CONTROL**](https://www.cdc.gov/infectioncontrol/index.html)

Infection control prevents or stops the spread of infections in healthcare settings.

**How Infections Spread**

Germs are a part of everyday life and are found in our air, soil, water, and in and on our bodies. Some germs are helpful, others are harmful. Many germs live in and on our bodies without causing harm and some even help us to stay healthy. Only a small portion of germs are known to cause infection.

**How Do Infections Occur?**

An infection occurs when germs enter the body, increase in number, and cause a reaction of the body.

Three things are necessary for an infection to occur:

* **Source:** Places where infectious agents (germs) live (e.g., sinks, surfaces, human skin)
* **Susceptible Person** with a way for germs to enter the body
* **Transmission:** a way germs are moved to the susceptible person

**Source**

**A Source is an infectious** agent or germ and refers to a virus, bacteria, or other microbe.

In healthcare settings, germs are found in many places. People are one source of germs including:

* Patients
* Healthcare workers
* Visitors and household members

People can be sick with symptoms of an infection or colonized with germs (not have symptoms of an infection but able to pass the germs to others).  
Germs are also found in the healthcare environment. Examples of environmental sources of germs include:

* Dry surfaces in patient care areas (e.g., bed rails, medical equipment, countertops, and tables)
* Wet surfaces, moist environments, and [biofilms](http://wwwnc.cdc.gov/eid/article/8/9/02-0063_article) (e.g., cooling towers, faucets and sinks, and equipment such as ventilators)
* Indwelling medical devices (e.g., catheters and IV lines)
* Dust or decaying debris (e.g., construction dust or wet materials from water leaks)

**Susceptible Person**

A susceptible person is someone who is not vaccinated or otherwise immune, or a person with a weakened immune system who has a way for the germs to enter the body. For an infection to occur, germs must enter a susceptible person’s body and invade tissues, multiply, and cause a reaction.

Devices like IV catheters and surgical incisions can provide an entryway, whereas a healthy immune system helps fight infection.

When patients are sick and receive medical treatment in healthcare facilities, the following factors can increase their susceptibility to infection.

* Patients in healthcare who have underlying medical conditions such as diabetes, cancer, and organ transplantation are at increased risk for infection because often these illnesses decrease the immune system’s ability to fight infection.
* Certain medications used to treat medical conditions, such as antibiotics, steroids, and certain cancer fighting medications increase the risk of some types of infections.
* Lifesaving medical treatments and procedures used in healthcare such as urinary catheters, tubes, and surgery increase the risk of infection by providing additional ways that germs can enter the body.

Recognizing the factors that increase patients’ susceptibility to infection allows providers to recognize risks and perform basic infection prevention measures to prevent infection from occurring.

**Transmission**

Transmission refers to the way germs are moved to the susceptible person.

Germs don’t move themselves. Germs depend on people, the environment, and/or medical equipment to move in healthcare settings.

There are a few general ways that germs travel in healthcare settings – through contact (i.e., touching), sprays and splashes, inhalation, and sharps injuries (i.e., when someone is accidentally stuck with a used needle or sharp instrument).

* Contact moves germs by touch (example: MRSA or VRE). For example, healthcare provider hands become contaminated by touching germs present on medical equipment or high touch surfaces and then carry the germs on their hands and spread to a susceptible person when proper hand hygiene is not performed before touching the susceptible person.
* Sprays and splashes occur when an infected person coughs or sneezes, creating droplets which carry germs short distances (within approximately 6 feet). These germs can land on a susceptible person’s eyes, nose, or mouth and can cause infection (example: pertussis or meningitis).
  + Close range inhalation occurs when a droplet containing germs is small enough to breathe in but not durable over distance.
* Inhalation occurs when germs are aerosolized in tiny particles that **survive on air currents over great distances** and time and reach a susceptible person. Airborne transmission can occur when infected patients cough, talk, or sneeze germs into the air (example: TB or measles), or when germs are aerosolized by medical equipment or by dust from a construction zone (example: Nontuberculous mycobacteria or aspergillus).
* Sharps injuries can lead to infections (example: HIV, HBV, HCV) when bloodborne pathogens enter a person through a skin puncture by a used needle or sharp instrument.

**Infection Control Basics**

There are 2 tiers of recommended precautions to prevent the spread of infections in healthcare settings:  
Standard Precautions and Transmission-Based Precautions.

**Standard Precautions for All Patient Care**

Standard precautions are used for all patient care. They’re based on a risk assessment and make use of common-sense practices and personal protective equipment use that protect healthcare providers from infection and prevent the spread of infection from patient to patient.

**Module 1**

* 1. [Hand Hygiene](https://www.cdc.gov/handhygiene/index.html)

**Recommendation**

* During the delivery of healthcare, avoid unnecessary touching of surfaces in close proximity to the patient to prevent both contamination of clean hands from environmental surfaces and transmission of pathogens from contaminated hands to surfaces
* When hands are visibly dirty, contaminated with proteinaceous material, or visibly soiled with blood or body fluids, wash hands with either a nonantimicrobial soap and water or an antimicrobial soap and water
* If hands are not visibly soiled, or after removing visible material with nonantimicrobial soap and water, decontaminate hands in the clinical situations described in. The preferred method of hand decontamination is with an alcohol-based hand rub. Alternatively, hands may be washed with an antimicrobial soap and water. Frequent use of alcohol-based hand rub immediately following handwashing with nonantimicrobial soap may increase the frequency of dermatitis.

**Perform hand hygiene ~ in the following clinical situations:**

* Before having direct contact with patients
* After contact with blood, body fluids or excretions, mucous membranes, nonintact skin, or wound dressings
* After contact with a patient’s intact skin (e.g., when taking a pulse or blood pressure or lifting a patient)
* If hands will be moving from a contaminated-body site to a clean-body site during patient care.
* After contact with inanimate objects (including medical equipment) in the immediate vicinity of the patient
* After removing gloves
* wash hands with non-antimicrobial soap and water or with antimicrobial soap and water if contact with spores (e.g., C. difficile or Bacillus anthracis) is likely to have occurred. The physical action of washing and rinsing hands under such circumstances is recommended because alcohols, chlorhexidine, iodophors, and other antiseptic agents have poor activity against spores
* Do not wear artificial fingernails or extenders if duties include direct contact with patients at high risk for infection and associated adverse outcomes (e.g., those in ICUs or operating rooms)

**MODULE 2**

**Personal Protective Equipment (PPE)**

**Observe the following principles of use:**

* Wear PPE, when the nature of the anticipated patient interaction indicates that contact with blood or body fluids may occur
* Prevent contamination of clothing and skin during the process of removing PPE
* Before leaving the patient’s room or cubicle, remove and discard PPE

**EXAMPLE OF PPES:**

**GLOVES**

* Wear gloves when it can be reasonably anticipated that contact with blood or other potentially infectious materials, mucous membranes, nonintact skin, or potentially contaminated intact skin (e.g., of a patient incontinent of stool or urine) could occur

Wear gloves with fit and durability appropriate to the task

1. Wear disposable medical examination gloves for providing direct patient care.
2. Wear disposable medical examination gloves or reusable utility gloves for cleaning the environment or medical equipment.

* Remove gloves after contact with a patient and/or the surrounding environment (including medical equipment) using proper technique to prevent hand contamination (see Figure). Do not wear the same pair of gloves for the care of more than one patient. Do not wash gloves for the purpose of reuse since this practice has been associated with transmission of pathogens
* Change gloves during patient care if the hands will move from a contaminated body-site (e.g., perineal area) to a clean body-site (e.g., face).

**Gowns**

* Wear a gown, that is appropriate to the task, to protect skin and prevent soiling or contamination of clothing during procedures and patient-care activities when contact with blood, body fluids, secretions, or excretions is anticipated.
* Wear a gown for direct patient contact if the patient has uncontained secretions or excretions
* Remove gown and perform hand hygiene before leaving the patient’s environment
* Do not reuse gowns, even for repeated contacts with the same patient.
* Routine donning of gowns upon entrance into a high risk unit (e.g., ICU, NICU, HSCT unit) is not indicated

**Mouth, nose, eye protection**

* Use PPE to protect the mucous membranes of the eyes, nose and mouth during procedures and patient-care activities that are likely to generate splashes or sprays of blood, body fluids, secretions and excretions. Select masks, goggles, face shields, and combinations of each according to the need anticipated by the task performed
* During aerosol-generating procedures (e.g., bronchoscopy, suctioning of the respiratory tract [if not using in-line suction catheters], endotracheal intubation) in patients who are not suspected of being infected with an agent for which respiratory protection is otherwise recommended (e.g., M. tuberculosis, SARS or hemorrhagic fever viruses), wear one of the following: a face shield that fully covers the front and sides of the face, a mask with attached shield, or a mask and goggles (in addition to gloves and gown)

**MODULE 3**

**Respiratory hygiene/cough etiquette**

The following measures are implemented to contain respiratory secretions in patients and accompanying individuals who have signs and symptoms of a respiratory infection, beginning at the point of initial encounter in a healthcare setting (e.g., triage, reception and waiting areas in emergency departments, outpatient clinics and physician offices)

* Post signs at entrances and in strategic places (e.g., elevators, cafeterias) within **ambulatory ( a place for walking )**and **inpatient settings** with instructions to patients and other persons with symptoms of a respiratory infection to cover their mouths/noses when coughing or sneezing, use and dispose of tissues, and perform hand hygiene after hands have been in contact with respiratory secretions.
* Provide tissues and no-touch receptacles (e.g., foot-pedal-operated lid or open, plastic-lined waste basket) for disposal of tissues
* Provide resources and instructions for performing hand hygiene in or near waiting areas in **ambulatory** and **inpatient settings**; provide conveniently located dispensers of alcohol-based hand rubs and, where sinks are available, supplies for handwashing
* During periods of increased prevalence of respiratory infections in the community (e.g., as indicated by increased school absenteeism, increased number of patients seeking care for a respiratory infection), offer masks to coughing patients and other symptomatic persons (e.g., persons who accompany ill patients) upon entry into the facility or medical office 126, 899 898 and encourage them to maintain special separation, ideally a distance of at least 3 feet, from others in common waiting areas.

**MODULE 4**

**Patient placement**

**Recommendation**

Include the potential for transmission of infectious agents in patient-placement decisions. Place patients who pose a risk for transmission to others (e.g. coronavirus) in a single-patient room when available

Determine patient placement based on the following principles:

* Availability of single-patient rooms
* Patient options for room-sharing (e.g., isolating patients with the same infection)

**MODULE 5**

**Patient-care equipment and instruments/devices**

**Recommendation**

* follow policies and procedures for transporting, and handling patient-care equipment and instruments/devices that may be contaminated with blood or body fluids
* Remove organic material from critical and semi-critical instrument/devices, using recommended cleaning agents before high level disinfection and sterilization to enable effective disinfection and sterilization processes
* Wear PPE (e.g., gloves, gown), according to the level of anticipated contamination, when handling patient-care equipment and instruments/devices that is visibly soiled or may have been in contact with blood or body fluids

**MODULE 6**

**Care of the environment**

Follow policies and procedures for routine and targeted cleaning of environmental surfaces as indicated by the level of patient contact and degree of soiling.

* Clean and disinfect surfaces that are likely to be contaminated with pathogens, including those that are in close proximity to the patient (e.g., bed rails, over bed tables) and frequently-touched surfaces in the patient care environment (e.g., door knobs, surfaces in and surrounding toilets in patients’ rooms) on a more frequent schedule compared to that for other surfaces (e.g., horizontal surfaces in waiting rooms)
* Use registered disinfectants that have microbiocidal (i.e., killing) activity against the pathogens most likely to contaminate the patient-care environment. Use in accordance with manufacturer’s instructions
* In facilities that provide health care to pediatric patients or have **waiting areas with child play toys** (e.g., **obstetric/gynecology offices and clinics**), follow policies and procedures for cleaning and disinfecting toys at regular intervals

**MODULE 7**

**Care of the environment**

Handle linens with minimum shaking to avoid contamination of air, surfaces and persons

minimize dispersion of aerosols from contaminated laundry

Precautions for dealing with contaminated linen include:

* Wearing PPE
* Washing contaminated linen separately
* Washing clothing in 40°C-50°C wash followed by tumble-drying or hot ironing
* Washing bedding and towels in a hot wash
* Sealing laundry in colour coded bags and moving to the washing area
* Washing infected linen immediately if you are supporting people in their own home

**Module 8**

**Worker safety**

Adhere to federal and state requirements for protection of healthcare personnel from exposure to bloodborne pathogens

1**. Wear Gloves**

Gloves prevent direct transmission to the hands. Double-gloving does not necessarily provide better protection against an organism. In addition, gloves do not provide protection against accidental exposure due to needle sticks. Therefore, take care when wearing gloves to prevent their tearing or damaging while providing care. If they do tear or rip, wash your hands and put on a near pair before continuing with providing patient care.

2. **Use a Face Shield if Splashing Is Likely**

Splashing body fluids may include removing an intravenous (IV) line too quickly, resulting in the brief propulsion of blood into the air, which may end up in your face. In this case, a face shield is appropriate. Similarly, a face shield may be necessary when providing perineal care, cleaning of the genitals.

3. **Wear a Mask if Splashing Into the Face Is Likely**

Masks are commonly listed under droplet or airborne precautions. However, they may be necessary when providing care if splashing is likely and a face shield is not fully effective.

For example, masks can provide protection if splashing may come from the bottom up. In other words, masks can prevent splashing of bodily fluids near the chin or mouth.

**4. Shoe Covers May Be Necessary**

Patients on contact isolation precautions represent a risk to other patients. One of the most forgotten aspects of contact isolation precautions is shoe covers. Some pathogens, such as HIV can live on surfaces outside the body until the next cleaning. Throughout the day, blood or blood-containing fluids may fall to the floor. While most of these cases are cleaned up immediately, the pathogen may survive. Thus, it could realistically be on the soles of your shoes, heading into the next room without proper protection.

Shoe covers may also benefit staff when caring for patients that have a bloodborne infection if blood or blood-containing fluids are likely to fall atop the shoes. For example, vomit may contain blood, and shoe covers may be necessary.

5. **Perform Hand Washing**

Due to increased risk of transmission of pathogens while on contact precautions, hand sanitizer should never be used as a substitute for hand washing. Hand sanitizers may be used after hand washing at the discretion of the health care professional.

6. **Report Any Possible Exposure Immediately**

The final step in addressing contact precautions is understanding the importance of reporting possible exposure. This includes accidental needle sticks or known exposure to blood or blood-containing fluids via mucus membranes or other entryways to the body.