



Regulatory Training

Infection Control, Clinical



Learning Objectives

Upon completion of this training, you will be able to:

- Define a health care associated infection
- Describe hand hygiene: how, what, when
- Identify infection prevention strategies
- List the 2 tiers of isolation precautions
- Describe standard precautions
- Describe the major components of the policy on **Employees Infected with a Bloodborne Pathogen**
- Identify the rationale for receiving the influenza vaccination as an employee's responsibility



Infection Control Overview

Preventing and Controlling the Spread of Infection

Welcome to the lesson on infection control. This lesson covers:

- Health care associated infection (HAI): definition, impact, and cause
- Hand hygiene: how, when, and what
- Antibiotic use: resistance and impact
- The Bloodborne Pathogens Standard – OSHA Regulation
- Airborne pathogens
- Standard Precautions
- Transmission-Based Precautions
- Personal protective equipment (PPE)
- Personal responsibility including employee health



Health Care Associated Infections: Definition and Impact

Health care associated infections (HAIs) are infections that patients acquire while receiving treatment for medical or surgical conditions within the health care system. HAIs occur in all settings of care, including acute care within hospitals and same day surgical centers, ambulatory outpatient care in health care clinics, and in long-term care facilities, such as nursing homes and rehabilitation facilities.

HAIs account for an estimated 1.7 million infections and 99,000 associated deaths each year. HAIs affect 5 to 10% of hospitalized patients annually and they add nearly \$28-33 billion to health care costs.

HAI can be very costly in terms of:

- Patient life and health
- Health care dollars



Health Care Associated Infections: Impact

The prevention and reduction of HAIs is a top priority for the U.S. Department of Health and Human Services (HHS). The Federal Government has established a committee to address the "Prevention of Health Care Associated Infections". This committee has been charged with developing a comprehensive strategy to prevent and reduce HAIs and issue a plan that establishes national goals for HAI prevention and outlines key actions for achieving identified short and long-term objectives. The plan is also intended to enhance collaboration with external stakeholders to strengthen coordination and impact of national efforts. Hospitals will not be reimbursed by certain payers (i.e., Centers of Medicare and Medicaid) for certain infections that patients acquire while in the hospital.

Four categories of infections account for approximately three quarters of HAIs in the acute care hospital setting including:

- [Surgical site infections](#)
- [Central line-associated bloodstream infections](#)
- [Ventilator-associated pneumonia](#)
- [Catheter-associated urinary tract infections](#)

Optional: You may click the links above to view external resources.



Health Care Associated Infections: Impact (Continued)

In addition, infections associated with *Clostridium difficile* and Methicillin-resistant *Staphylococcus aureus* (MRSA) also contribute significantly to the overall problem.

The frequency of HAIs varies by location. Currently, urinary tract infections comprise the highest percentage (34%) of HAIs followed by surgical site infections (17%), bloodstream infections (14%), and pneumonia (13%).

In addition to the substantial human suffering exacted by HAIs, the financial burden attributed to these infections is staggering. The Centers for Medicare and Medicaid will not be reimbursing hospitals for treating hospital-acquired conditions.



Health Care Associated Infections: Cause

HAIs may be caused by bacteria, viruses, fungi, or parasites. These infectious organisms or "germs" may come from:

- Environmental sources (dust, medical equipment, doorknobs, etc.)
- Other patients
- Staff members
- Hospital visitors

Depending on the agent, infection may be transmitted person-to-person via the:

- Contact route
- Droplet route
- Airborne route

Infection prevention and control for each of these routes of transmission will be discussed in greater detail later in the lesson.



Hand Hygiene: When and What

The single most important factor for preventing the spread of infection is proper hand hygiene.

- According to the CDC, hand hygiene is considered either washing hands with soap and water or using an alcohol-based waterless agent.
- Hands should be washed or decontaminated before and after each direct patient contact.
- Current CDC guidelines recommend the use of:
 - Soap and water for washing visibly soiled hands
 - Alcohol-based hand rubs for routine decontamination of hands between patient contacts when hands are not visibly soiled
- It is appropriate for patients to ask or remind health care providers to practice hand hygiene!

ALWAYS FOAM IN AND FOAM OUT!



Hand Hygiene: How

When washing with soap and water:

- Remove rings, jewelry, and watches
- Pre-wet hands with running water (lukewarm)
- Use an appropriate amount of soap
- Rub all surfaces of the hands and wrists for 20 seconds (sing Happy Birthday twice)
- Rinse thoroughly under running water
- Close the faucets with paper towels
- Dry hands by patting with a disposable towel

When decontaminating hands with an alcohol waterless rub:

- Remove jewelry
- Apply the amount of rub recommended by the manufacturer
- Rub all surfaces of the hands and wrists until hands are dry

ALWAYS FOAM IN AND FOAM OUT!



Invasive Procedures

Many HAIs are related to invasive procedures, especially:

- Catheterization
- IV line placement

The most common type of HAI is urinary tract infection (UTI), associated with indwelling urinary catheters. Therefore:

- High-risk procedures such as catheterization should be performed only when absolutely necessary
- Catheters should be removed as soon as clinically possible
- Instruments and equipment used for invasive procedures should be properly sterilized before use; they should be used with aseptic technique
- All licensed providers must pass the Prevention of Catheter Related Bloodstream Infections eLearning module annually



Antibiotic Use and Resistance

Widespread use of antibiotics began in the 1940's. Penicillin and other antibiotics were hailed as miracle drugs. They were able to cure previously untreatable bacterial illnesses. However, bacteria are very adaptable. They have the ability to change genetically to resist the effects of antibiotics.

The more antibiotics are used, the more common resistant strains of bacteria become. Multi-Drug Resistant Organisms (MDROs) have increased in prevalence in US hospitals over the last three decades. These organisms have important implications for patient safety.



Antibiotic Resistance

Clinically important examples of resistant organisms include:

- Methicillin-resistant *Staphylococcus aureus* (MRSA)
- Vancomycin-resistant *Enterococci* (VRE)
- Drug-resistant *Streptococcus pneumoniae* (DRSP)
- Multi drug-resistant *Mycobacterium tuberculosis* (MDR-TB)

Clinically important examples of Multi-Drug Resistant Organisms (MDRO) include:

- Acinetobacter
- Klebsiella Pneumoniae Carbapenemase (KPC)
- C. Difficile



Antibiotic Use: Impact of Resistance

Antibiotic resistance is a significant health problem

It affects:

Drug Choice

When an infection is resistant to the antibiotic of choice, other antibiotics must be used instead. These second-choice drugs are often:

- Less effective against the bacteria
- More toxic to the patient
- More expensive



Antibiotic Use: Impact of Resistance

Antibiotic resistance is a significant health problem

It affects:

Patient Health

Patients with resistant infections tend to have:

- Lengthier illness
- Higher medical bills
- Greater risk of death



Antibiotic Use: Impact of Resistance

Antibiotic resistance is a significant health problem

It affects:

The Health Care System

- Antibiotic-resistant strains contribute significantly to HAI.
- More than 70% of all bacteria that cause HAI are found to be resistant to one or more commonly used antibiotics.
- Antibiotic resistance is increasing in the hospital setting due to increasingly complex health care delivery systems, increasing use/overuse of antibiotics, unrecognized colonization, increasing risks of environmental contamination, and lack of resources/compliance with prevention strategies.



Antibiotic Use, Preventing Resistance

Health care professionals must take an active role in preventing the spread of antibiotic resistance.

Strategies include:

- [Preventing infection](#)
- [Diagnosing and treating infection effectively](#)
- [Using antibiotics prudently](#)
- [Preventing spread of infection](#)

Click on each of the links above to learn more about each element.

When you have reviewed all four... [click here](#) to continue this lesson.



Antibiotic Use, Preventing Resistance

Health care professionals must take an active role in preventing the spread of antibiotic resistance.

Strategies include:

One of the best techniques we have to prevent infection is vaccination.

- Patients should be kept up on appropriate vaccinations.
- Health care workers also should receive appropriate vaccinations, including annual influenza immunization. Many professional agencies and organizations, including the Centers for Disease Control and Prevention (CDC), the National Foundation for Infectious Diseases (NFID), the Infectious Disease Society of America, and the Joint Commission on Accreditation of Health Care Organizations (JCAHCO) recommend annual influenza vaccinations for health care personnel (HCP) because of their increased risk of contracting and transmitting influenza. By being vaccinated, HCP decrease their likelihood of contracting influenza and decrease the chance of infecting others. It is imperative for HCP to set an example for the patients they serve by being vaccinated and also by being informed with the most current influenza information in order to properly educate them.



Bloodborne Pathogens

Bloodborne diseases are those infectious diseases, which are transmitted through the blood or other body fluids. Workers in the health care industry and related occupations are at risk of occupational exposure to bloodborne pathogens via blood and other potentially infectious materials including: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids, such as HIV/HBV/HCV containing cultures (cell, tissue, or organ), culture medium, or other solutions. Exposures can occur via needle stick injury, exposure to mucous membranes, or non-intact skin. Important bloodborne diseases include:

- HIV/AIDS
- Hepatitis B
- Hepatitis C



The Bloodborne Pathogen Standard

The purpose of the Bloodborne Pathogen Standard is to eliminate or minimize occupational exposure to Hepatitis B Virus (HBV), Human Immunodeficiency Virus (HIV), and other bloodborne pathogens. The Bloodborne Pathogen Standard is a federal regulation administered by OSHA (Occupational Health and Safety Administration) in 1991.

One of the key components of the Bloodborne Pathogen Standard is the use of Standard Precautions. Standard Precautions protect health care workers from exposure to patient:

- Blood
- Bodily fluids, secretions, and excretions (except sweat)
- Non-intact skin
- Mucous membranes

Standard Precautions must be used in the care of all patients, *every time and every encounter.*



The Bloodborne Pathogen Standard Additional Requirements

- Proper disposal of waste is part of the bloodborne pathogen regulation. Regulated medical waste includes: sharps, infectious cultures, bulk blood/blood products, body parts, and pathological waste.
- Any item soaked with blood that is dripping is considered regulated medical waste and must be disposed of appropriately.
- Medical waste must be collected, stored, and shipped in leak-proof containers and disposed of by off-site incineration (which must be tracked).
- Have an exposure control plan that addresses all the elements of standard.
- Review and update the exposure control plan at least annually.



The Bloodborne Pathogen Standard Needle Stick Safety & Prevention Act of 2001

The Needle Stick Safety and Prevention Act (H.R. 5178) mandated that the 1991 Bloodborne Pathogen Standard (29 CFR 1910.1030) be revised to strengthen the requirements related to the use of safety-engineered sharp devices

The revised standard clarifies the need for employers [to select safer needle devices](#) and to [involve employees in identifying and choosing these devices](#). The updated standard also requires employers to [maintain a log of injuries from contaminated sharps](#).



Optional: You may click the links above to view external resources.



Isolation Precautions: Two Tiers

There are two tiers of isolation precautions used in the hospital:

- **Standard:** used routinely for the care of all patients regardless of diagnosis or presumed infection status and organism
- **Transmission-based:** designed for patients documented or suspected to be infected or colonized with organisms that require additional precautions beyond the standard precautions necessary to interrupt transmission. These precautions apply to
 - airborne
 - droplet
 - contact transmissions
- The precautions may be combined for diseases that have multiple routes of transmission. These precautions are always to be used in addition to standard precautions.

Let's look at Standard Precautions first.



Standard Precautions: First Tier

Standard Precautions must be used in the care of all patients, regardless of their diagnosis or organism, at all times, and for every encounter. These Precautions apply to a patient's:

- Blood
- Bodily fluids
- Secretions and excretions (except sweat)
- Non-intact skin
- Mucous membranes

The major provisions of Standard Precautions are summarized in table form on the next screen.

Note: In the table, the term "bodily fluids" is used to indicate all patient fluids to which Standard Precautions apply (i.e., blood, body fluids, secretions, excretions).



Standard Precautions

Standard Precautions must be used in the care of all patients.

If an exposure occurs, call the BUGS beeper (2847).

| | |
|---|---|
| Hand Hygiene | <p>Wash/Decontaminate hands:</p> <ul style="list-style-type: none">•After touching bodily fluids or contaminated items•After removing gloves•Between (before and after) patient contacts |
| Gloves | <ul style="list-style-type: none">•Wear gloves when touching bodily fluids or contaminated items•Put on clean gloves before touching mucous membranes or non-intact skin•Change gloves between "dirty" and "clean" tasks on the same patient•Remove gloves promptly after use (before going to another patient); wash hands immediately |
| Mask, Eye Protection, Face Shield, Gown | <ul style="list-style-type: none">•Use personal protective equipment (PPE) as necessary to protect against splashes or sprays of bodily fluids•Facial protection including eye, nose, and mouth protection is essential when there is any aerosolized-generating procedures being performed•Prescription eyeglasses are NOT considered personal protective equipment |
| Patient-Care Equipment & Linens | <ul style="list-style-type: none">•Equipment and linens soiled with bodily fluids should be handled in a way that avoids cross-contamination•Clean and reprocess reusable equipment appropriately before use on another patient•Discard single-use items appropriately |



Standard Precautions Application

Standard Precautions must be used in the care of all patients.

If an exposure occurs, call the BUGS beeper (2847).

| | |
|---------------------------|--|
| Environmental Care | Environmental surfaces should be cleaned and disinfected on a routine basis and when visibly soiled/contaminated. |
| Bloodborne Pathogens | <ul style="list-style-type: none">•Use sharps (needles, scalpels, etc.) carefully and appropriately. For example, do not bend or recap needles•Take care to prevent accidental sticks |
| Patient Placement | Patients who contaminate the environment should be placed in private rooms. |
| Disposal of Waste | Regulated Medical Waste includes: <ul style="list-style-type: none">•Infectious cultures and stocks of infectious agents•Bulk blood/blood products•Pathological wastes/body parts•Sharps•Animal carcasses/bedding |
| Handling of Medical Waste | <ul style="list-style-type: none">•Must be collected, stored and shipped in leak-proof containers•Disposed of by off-site incineration (with cradle to grave tracking) |
| Specimen collection | All specimens are considered biohazardous and should be handled using gloves. All specimens must be placed in zip lock specimen bags with the universal biohazard symbol on the front. Specimens must go inside the zip lock, and the requisitions must be placed in the pouch in front of the zip lock. |



Standard Precautions Every Patient, Every Time, Every Encounter

STANDARD PRECAUTIONS also include the following (**every patient, every time, every encounter**) infection control interventions:

- Foaming in and foaming out
- Cleaning your stethoscope with alcohol pads
- Cleaning all other equipment with Sani-Cloth between each patient contact
- Wearing gloves, gown, and eyewear when there is potential for exposure to secretions and/or excretions





Isolation Precautions Second Tier

The second tier of isolation precautions used in the hospital is: Transmission-based precautions.

These precautions are designed for patients documented or suspected to be infected or colonized with organisms that require additional precautions beyond the standard precautions necessary to interrupt transmission.

These precautions apply to these transmission routes:

- Airborne
- Droplet
- Contact transmissions

The precautions may be combined for diseases that have multiple routes of transmission. These precautions are always to be used in addition to standard precautions.

Now let's look at Transmission-based Precautions.



Transmission-based Precautions: Airborne, Background

Airborne diseases are transmitted (mechanism in which the infectious agent is spread as an aerosol and usually enters a person through the respiratory tract) by dissemination of either airborne droplet nuclei or small particles that remain infective over time and distance. Microorganisms carried in this manner may be dispersed over long distances by air currents and may be inhaled by susceptible individuals who have not had face-to-face contact with (or been in the same room with) the infectious individual.

Employees going into an Airborne Precautions room must be fit tested for an N95 respirator mask or be instructed in the proper use and care of a Powered Air Purifying Respirator (PAPR) Unit every year.



Transmission-based Precautions: Airborne, Respirator

Airborne Precautions are used to prevent the spread of airborne diseases in the health care setting.

All health care staff who are likely to go into a room of an Airborne Precautions patient must be medically cleared by Employee Health to be fit tested for an appropriate N95 respirator mask. Fit testing must occur annually. Those who fail fit testing must be trained in the proper use of a Powered Air Purifying Respirator (PAPR) unit . PAPR training must occur annually.

Either of these precautions will protect staff members from spread of the infection.

Staff who have not been trained in Airborne Precautions and respirator use should NOT enter airborne isolation rooms.



Transmission-based Precautions: Airborne, Tuberculosis

Tuberculosis (TB) is an airborne disease. Therefore, Airborne Precautions apply.

In addition, both the CDC and OSHA have specific guidelines for preventing transmission of TB in the health care setting.



Transmission-based Precautions: Airborne Precautions, Summary

Airborne Precautions are used, along with Standard Precautions, in the care of all patients with a diagnosed or suspected airborne-transmitted disease.

- **Patient Placement:** Patients on Airborne Precautions are isolated in private rooms with special air handling and ventilation systems.
- **Respiratory Protection:** Health care staff must wear personal respirators whenever they enter an airborne isolation room or negative pressure room. Health care staff must wear N95 personal respirators, to which they have been previously fit tested, whenever they enter an Airborne Precautions room.
- **Patient Transport:** Patient transport should be limited as much as possible. Patients should only leave an Airborne Precautions room only for essential purposes (diagnostic tests, surgery, etc.). When patients leave Airborne Precautions rooms, they must wear a regular surgical mask.



Transmission-based Precautions: Contact Precautions

- Contact Precautions are indicated for any patient regardless of organism who has uncontrolled/uncontained secretions/excretions/drainage
- Additionally, specific other diseases may also require contact precautions (e.g., RSV, Impetigo, C.diff, ESBL, KPC, etc.) - refer to [Policy # 5003](#)

To prevent the transmission of contact diseases in the health care setting, Contact Precautions are used, as shown on the next screen.



Transmission-based Precautions: Contact Precautions, Summary

Contact Precautions are to be used, along with Standard Precautions, in the care of all patients with a diagnosed or suspected contact-transmitted disease.

- **Patient Placement:** Patients on Contact Precautions are isolated in private rooms or cohorted. Inpatients who are known to be on Contact Precautions must wear a Contact Precautions bracelet.
- **Gloves, Gowns, and Hand Antisepsis:** All health care workers entering a room must wear disposable gloves. Gowns must be worn for all direct patient contact or anticipated contact of clothing with environmental surfaces and/or patient-care items that may be contaminated. Hand hygiene must be practiced after glove removal.
- **Patient Transport:** Patient transport should be limited as much as possible.
- **Patient-Care Equipment:** Non-critical equipment should be dedicated to a single patient or cohort on Contact Precautions. If this is not possible, equipment should be cleaned and disinfected between patients.



Transmission-based Precautions: Droplet, Diseases

Examples of droplet diseases are:

- Mumps
- Rubella
- Influenza (seasonal and novel H1N1)
- Meningococcal meningitis
- Pertussis

To prevent the transmission of droplet diseases in the health care setting, Droplet Precautions are used, as shown on the next screen.



Transmission-based Precautions: Droplet, Background

Droplet transmission happens via large respiratory droplets.

These droplets:

- Are generated during coughing, sneezing, talking, etc.
- Travel a short distance through the air (up to three feet)
- Droplets may land on the mucous membranes of a nearby person's eyes, nose, or mouth



Disease transmission then may occur.



Transmission-based Precautions: Droplet Precautions, Summary

Droplet Precautions are to be used, along with Standard Precautions, in the care of all patients with a diagnosed or suspected droplet-transmitted disease.

- **Patient Placement:** Patients on Droplet Precautions should be isolated in private rooms or cohorted. If a private room is not available and cohorting is not possible, patients should be placed at least 3 to 6 feet away from the nearest patient or visitor.
- **Masks:** Health care staff should use surgical masks whenever caring for or working within 3 to 6 feet of a patient on Droplet Precautions. All persons entering the room must wear a surgical mask.
- **Patient Transport:** Patient transport should be limited as much as possible. When patients must leave their Droplet Precautions room, they must wear a surgical mask.

Respiratory protection in the health care setting for the influenza virus may change periodically based on new recommendations or guidelines.



Personal Protective Equipment (PPE)

Personal protective equipment (PPE) is an important component of infection control. PPE helps to prevent the spread of microorganisms both:

- From patient to health care worker
- From health care worker to patient

Review the screens describing Standard Precautions, Airborne Precautions, Contact Precautions, and Droplet Precautions for appropriate use of key items of PPE. Note the use of the PPE:

- Gloves
- Masks
- Goggles
- Gowns
- Respirators

All PPE is to be removed immediately after use and is not intended to be worn while not providing care to a patient.



Personal Reliability & Accountability: Employee Health

As a health care worker, you have personal responsibilities for infection control. Maintain immunity to vaccine-preventable diseases such as:

- Hepatitis B
- Measles
- Varicella (chickenpox)
- Rubella
- Mumps
- Influenza

Report all unprotected exposures, such as accidental needle sticks or blood/bodily fluid splashes to the eyes and mouth by paging the BUGS beeper (2847).



Personal Reliability & Accountability

Patients who register through UMass Memorial Health Care system for a medical appointment and who are coughing should be provided a surgical mask to be worn in order to protect other patients and health care workers with whom they come into contact.

Yearly flu shots are vitally important for your health and your family as well as the health of our patients. The Massachusetts Department of Health requires that if you don't get vaccinated you must sign a declination form. This information is now publically reported.

Get vaccinated ANNUALLY!

Stay home from work when you are sick.

When you become ill while at work, you should go home.