



Infection Prevention: Best Practices for Transmission-Based Precautions

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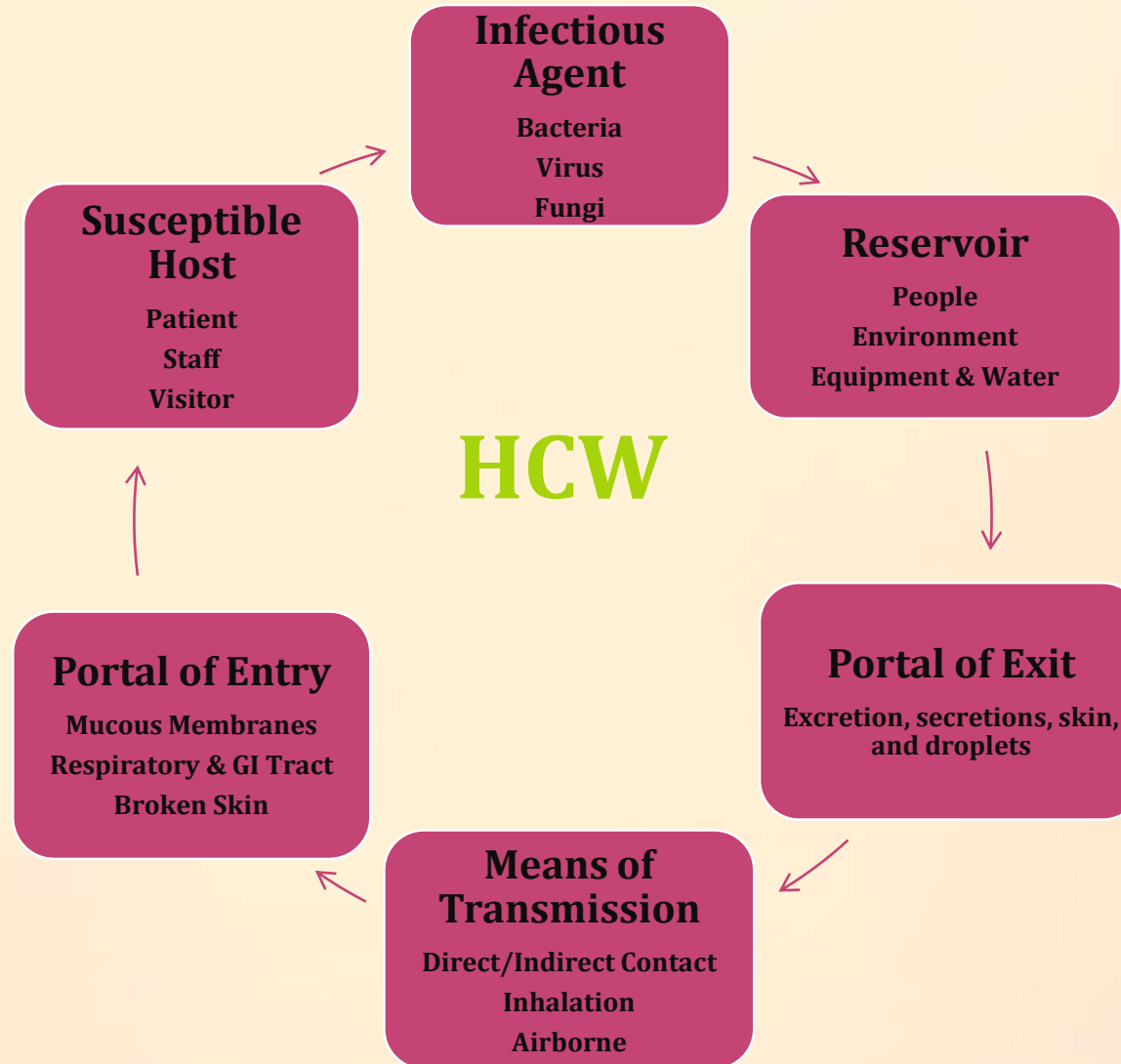
Objectives

- Review the Chain of Infection
- Identify Routes of Transmission
- Differentiate Categories of Transmission-Based Precautions
- Discuss Hand Hygiene Basics
- Discuss the role of Environmental Services in Infection Prevention

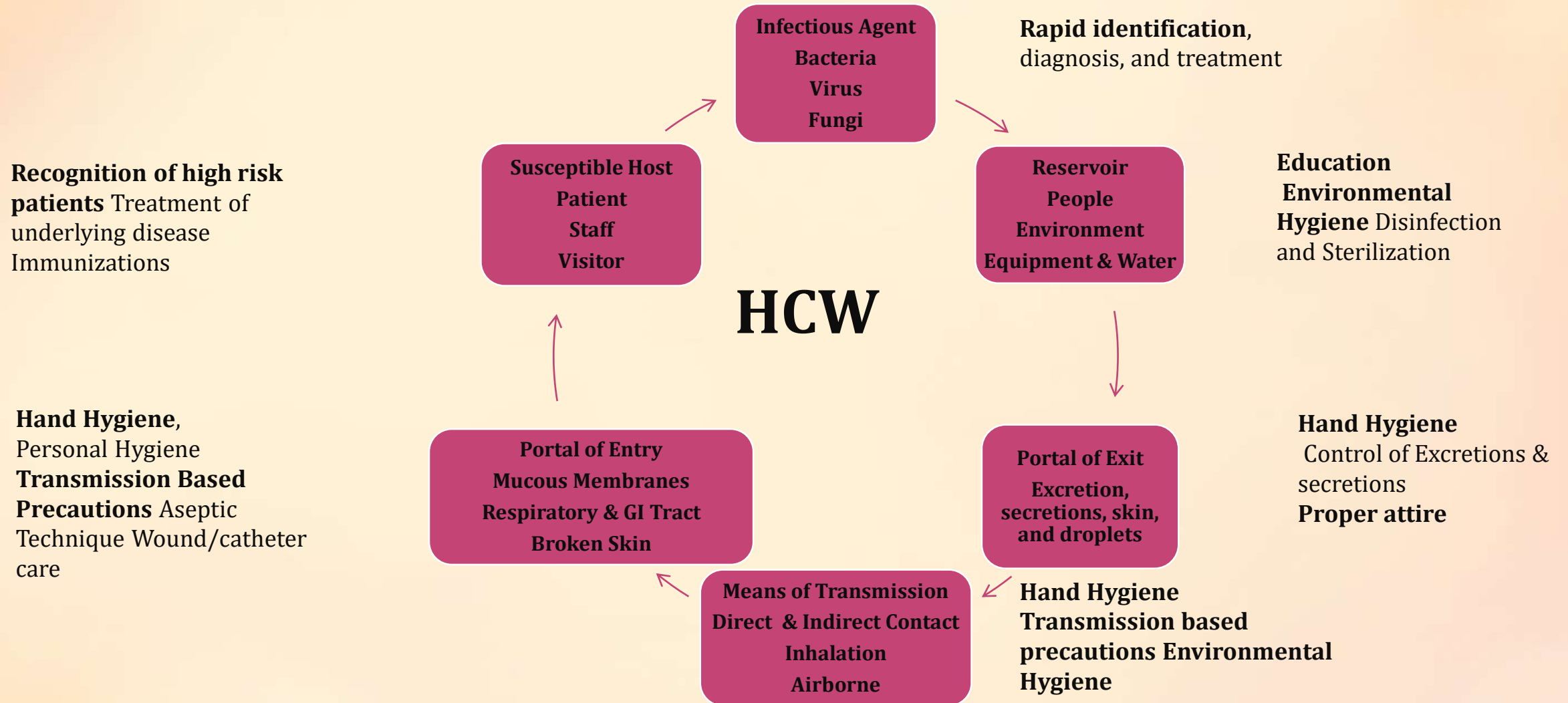
Key points

- Microorganisms can be spread from patients to patients and patients to healthcare workers
- Isolation precautions can reduce transmission decreasing the spread of microbes
- Components: hand hygiene, personal protective equipment, single rooms, ventilation and restriction of movement.
- Must be applied according to signs and symptoms

The Chain of Infection



Breaking the chain of infection



Breaking the chain of infection transmission



Equipment cleaning



Hand Hygiene



Compliance w/ Precautions

What are Transmission Based Precautions ?

Transmission-Based Precautions are designed to supplement standard precautions in patients/residents with documented or suspected infection/colonization of highly transmissible or epidemiologically important pathogens.

Three basic routes of transmission

□ Contact

- Direct
- Indirect



□ Droplet

- Larger; don't travel long distances, not infective over time
- Spatial separation (≥ 3 feet)

□ Airborne

- Smaller; infective over time and distance

<https://www.cdc.gov/hicpac/2007IP/2007isolationPrecautions.html>



Transmission Based Precautions

Contact Precautions

- Hand Hygiene
- Gown
- Gloves

Droplet Precautions

- Hand Hygiene
- Mask

Airborne Precautions

- Hand Hygiene
- Negative pressure room
- N-95 Respirator mask

Rationale

- **Transmission of infectious agents within a healthcare setting requires three elements:**

1. A source (or reservoir) of infectious agents



2. A susceptible host with a portal of entry receptive to the agent



3. A mode of transmission for the agent



Hand Hygiene



- “Hand Hygiene (HH) has been cited frequently as the **single most important practice to reduce the transmission of infectious agents in healthcare settings** and is an essential element of Standard Precautions.”
- **The term “hand hygiene” includes:**
 - Handwashing with soap and water
 - Use of alcohol-based products that do not require the use of water (**>60% alcohol**)
 - No artificial nails for those having contact with (high-risk) patients

“CDC/Healthcare Infection Control Practices Advisory Committee (HICPAC) recommend that artificial fingernails and extenders not be worn by healthcare personnel who have contact with high-risk patients due to the association with outbreaks of gram-negative bacillus and candida infections.”

Contact Precautions

- “Contact Precautions are intended to prevent transmission of infectious agents, including epidemiologically important microorganisms, which are spread by direct or indirect contact with the patient or the patient’s environment.”
- *Healthcare personal caring for patients on contact precautions **MUST** wear an isolation gown and gloves/personal protective equipment (PPE) for all interactions (that may involve **contact with the patient or potentially contaminated areas in the patients environment**)*
- Donning (putting on) of PPE must occur **immediately prior to entry**
- Doffing (removing) PPE must occur **immediately prior to exiting**



ANYONE ENTERING THE PATIENT ROOM MUST COMPLY WITH TRANSMISSION BASED PRECAUTIONS

Transport of patient on contact precautions

Transportation of patients in Contact Precautions

- Receiving unit/ area should be notified of patient being in contact precautions
- Perform hand hygiene
- Gown and gloves upon entry into patient room
- Once the patient is ready to transport, place a clean sheet over the patient.
- Place clean gown & gloves on the clean sheet for each person transporting in case there is a need to come into physical contact with patient during transport.
- Immediately prior to leaving the room, remove gown and gloves- do not wear gown and gloves outside the room, even they are clean.
- Perform hand hygiene upon leaving the patient's room.



Droplet Precautions

- Droplet Precautions are intended to prevent transmission of pathogens spread through close respiratory or mucous membrane contact with respiratory secretions.”

“Pathogens requiring droplet precaution **do not remain infectious over long distances** in a healthcare facility and so do not require special air handling and ventilation to prevent droplet transmission.”

- Don face mask (**NOT** N-95 respirator) prior to entering patient room
- Spacial separation ≥ 3 feet
- Place face mask on patient for transport outside of room



Airborne Precautions

- “Airborne Precautions prevent transmission of infectious agents that remain infectious over long distances when suspended in the air (measles, chicken pox, TB)”
- Patient must be placed in an airborne isolation infection room (AIIR): this is a single-patient room equipped with special air handling and ventilation capacity that complies with specific regulatory guidelines:
 - monitored negative pressure relative to the surrounding area
 - 6 or 12 air exchanges/hour
 - Air exhausted directly to the outside **or**
 - recirculated through a HEPA filtration system before return
 - Door **MUST** remain closed
 - Staff must wear N-95 respirator mask



But what's missing in the discussion?

Standard Precautions

- Apply to **all patients** receiving care in hospitals, regardless of their diagnosis or presumed infection status
- Designed to reduce the risk of transmission of microorganisms from both **recognized and unrecognized** sources of infections
- Under standard precautions, **blood and body fluids of all patients** are considered potentially infectious

Standard Precautions

- Standard Precautions combine the major features of Universal Precautions and Body Substance Isolation and are based on the principle that ***all blood, body fluids, secretions, excretions (except sweat), nonintact skin, and mucous membranes may contain transmissible infectious agents.*** 2007 HICPAC Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings

“Standard Precautions include a group of infection prevention practices that apply to all patients, regardless of suspected or confirmed infection status.”

- Hand Hygiene



- Use of gowns, gloves, face shields, eye protection



- Safe injection practices



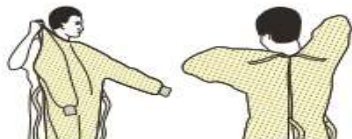
PPE Donning

SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist



2. MASK OR RESPIRATOR

- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator



3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit



4. GLOVES

- Extend to cover wrist of isolation gown



USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene



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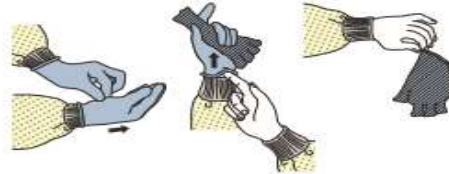
PPE Doffing

HOW TO SAFELY REMOVE PERSONAL PROTECTIVE EQUIPMENT (PPE) EXAMPLE 1

There are a variety of ways to safely remove PPE without contaminating your clothing, skin, or mucous membranes with potentially infectious materials. Here is one example. **Remove all PPE before exiting the patient room** except a respirator, if worn. Remove the respirator **after** leaving the patient room and closing the door. Remove PPE in the following sequence:

1. GLOVES

- Outside of gloves are contaminated!
- If your hands get contaminated during glove removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Using a gloved hand, grasp the palm area of the other gloved hand and peel off first glove
- Hold removed glove in gloved hand
- Slide fingers of ungloved hand under remaining glove at wrist and peel off second glove over first glove
- Discard gloves in a waste container



2. GOGGLES OR FACE SHIELD

- Outside of goggles or face shield are contaminated!
- If your hands get contaminated during goggle or face shield removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Remove goggles or face shield from the back by lifting head band or ear pieces
- If the item is reusable, place in designated receptacle for reprocessing. Otherwise, discard in a waste container



3. GOWN

- Gown front and sleeves are contaminated!
- If your hands get contaminated during gown removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Unfasten gown ties, taking care that sleeves don't contact your body when reaching for ties
- Pull gown away from neck and shoulders, touching inside of gown only
- Turn gown inside out
- Fold or roll into a bundle and discard in a waste container



4. MASK OR RESPIRATOR

- Front of mask/respirator is contaminated — DO NOT TOUCH!
- If your hands get contaminated during mask/respirator removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp bottom ties or elastics of the mask/respirator, then the ones at the top, and remove without touching the front
- Discard in a waste container



5. WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE



PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS BECOME CONTAMINATED AND IMMEDIATELY AFTER REMOVING ALL PPE



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HOW TO SAFELY REMOVE PERSONAL PROTECTIVE EQUIPMENT (PPE) EXAMPLE 2

Here is another way to safely remove PPE without contaminating your clothing, skin, or mucous membranes with potentially infectious materials. **Remove all PPE before exiting the patient room** except a respirator, if worn. Remove the respirator **after** leaving the patient room and closing the door. Remove PPE in the following sequence:

1. GOWN AND GLOVES

- Gown front and sleeves and the outside of gloves are contaminated!
- If your hands get contaminated during gown or glove removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp the gown in the front and pull away from your body so that the ties break, touching outside of gown only with gloved hands
- While removing the gown, fold or roll the gown inside-out into a bundle
- As you are removing the gown, peel off your gloves: at the same time, only touching the inside of the gloves and gown with your bare hands. Place the gown and gloves into a waste container



2. GOGGLES OR FACE SHIELD

- Outside of goggles or face shield are contaminated!
- If your hands get contaminated during goggle or face shield removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Remove goggles or face shield from the back by lifting head band and without touching the front of the goggles or face shield
- If the item is reusable, place in designated receptacle for reprocessing. Otherwise, discard in a waste container



3. MASK OR RESPIRATOR

- Front of mask/respirator is contaminated — DO NOT TOUCH!
- If your hands get contaminated during mask/respirator removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp bottom ties or elastics of the mask/respirator, then the ones at the top, and remove without touching the front
- Discard in a waste container



4. WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE



PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS BECOME CONTAMINATED AND IMMEDIATELY AFTER REMOVING ALL PPE



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Standard Precaution PPE



Food for thought....

Survival Time on Surfaces

- *Acinetobacter* 3 days – 5 months
- *C. difficile* 5 months
- *E. coli* 1.5 hrs – 16 months
- *Enterococcus sp.* 5 days - 4 months
- *Pseudomonas* 6 hrs – 16 months
- *S. aureus* 7 days – 7 months
- HIV > 7 days
- HBV > 1 week
- *Influenza* 1- 2 days

References

- CDCs Donning and Doffing Guidelines
<file:///C:/Users/mhule/AppData/Local/Microsoft/Windows/INetCache/IE/410EW6RG/PPE-Sequence.pdf>
-
- CDCs 2007 Isolation Guidelines
<file:///C:/Users/mhule/AppData/Local/Microsoft/Windows/INetCache/IE/E9B9P01K/Isolation2007.pdf>
-
- CDCs Guideline for Hand Hygiene in Health-Care Settings
<file:///C:/Users/mhule/AppData/Local/Microsoft/Windows/INetCache/IE/E9B9P01K/rr5116.pdf>

Thank You!
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