



**General Microbiology
2022-2023
Infection Control
Lecture 11**

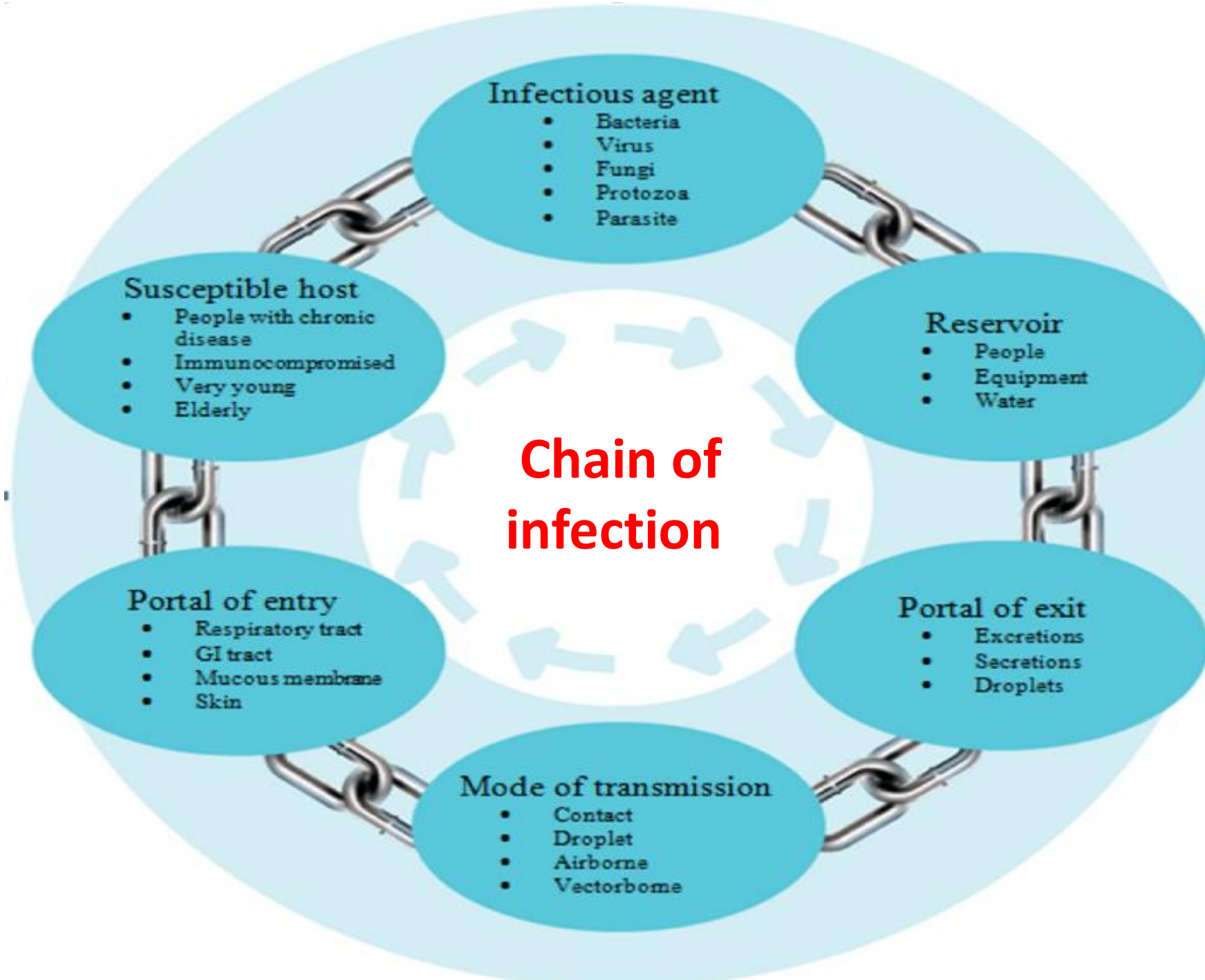
Dr. Mohammad Odaibate
Department of Microbiology and Pathology
Faculty of Medicine, Mutah University



Infection Control

Definition:

- Is the discipline concerned with preventing nosocomial or healthcare-associated infection
- **Aims of infection control:** to control the spread of infections within the healthcare setting including from
 - patient-to-patient
 - patients to staff
 - staff to patients, or among-staff



Precautions

```
graph TD; A[Precautions] --> B[+]; B --- C([Standard Precautions]); B --- D([Transmission-Based Precautions]);
```

**Standard
Precautions**

**Transmission-
Based
Precautions**

Standard Precautions

Definition of Standard Precautions:

- Include a group of infection prevention practices that **apply to all patients**, regardless of suspected or confirmed infection status, in any setting in which healthcare is delivered.
- Are based on the principle that all body fluids may contain transmissible infectious agents including:
 - Blood.
 - Secretions and excretions except sweat.
 - Non intact skin and mucous membranes.

Standard Precautions



Hand hygiene



Use of gloves



Personal protective equipment



Use of gowns/apron



Safe handling of sharps



Safe handling of waste



Environmental cleaning



Safe handling of soiled linen

Personal protective equipments (PPEs)

Gloves



Gowns



Apron



cap/hair cover



Eye Protection



Mask



Safety Devices



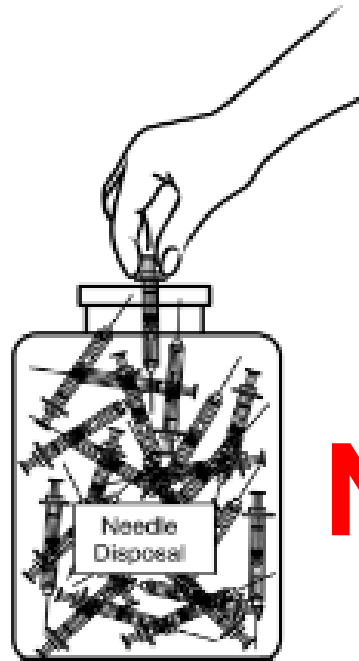
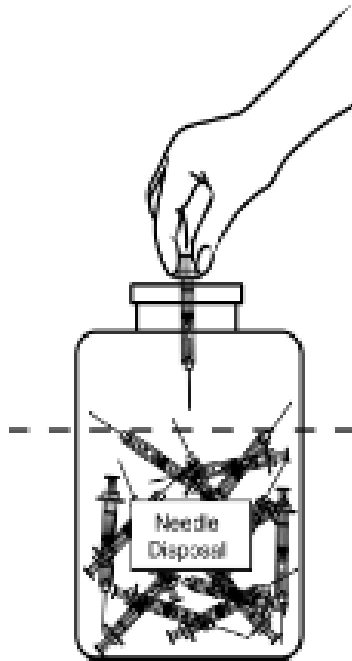
shoe covers



Sharp containers



Yes



NO



Prevention of needle stick/sharp injuries

Never recap

Never recap

NEVER RECAP

.....

AIDS



Hepatitis

Never recap

Never recap

NEVER RECAP

Recapping using one handed technique

If you must recap, use the "one-hand" technique:

Step 1

- Place the cap on a flat surface, then remove your hand from the cap.

Step 2

- With one hand, hold the syringe and the needle to pick up the cap.

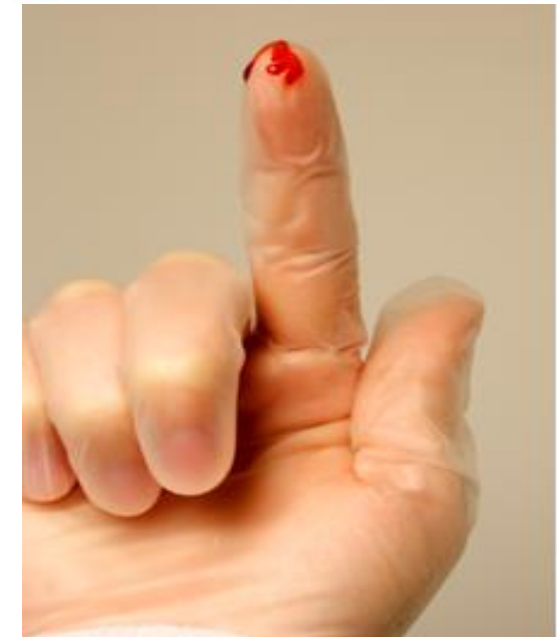
Step 3

- When the cap covers the needle completely, use the other hand to secure the cap on the needle hub. Be careful to handle the cap at the bottom only (near the hub).

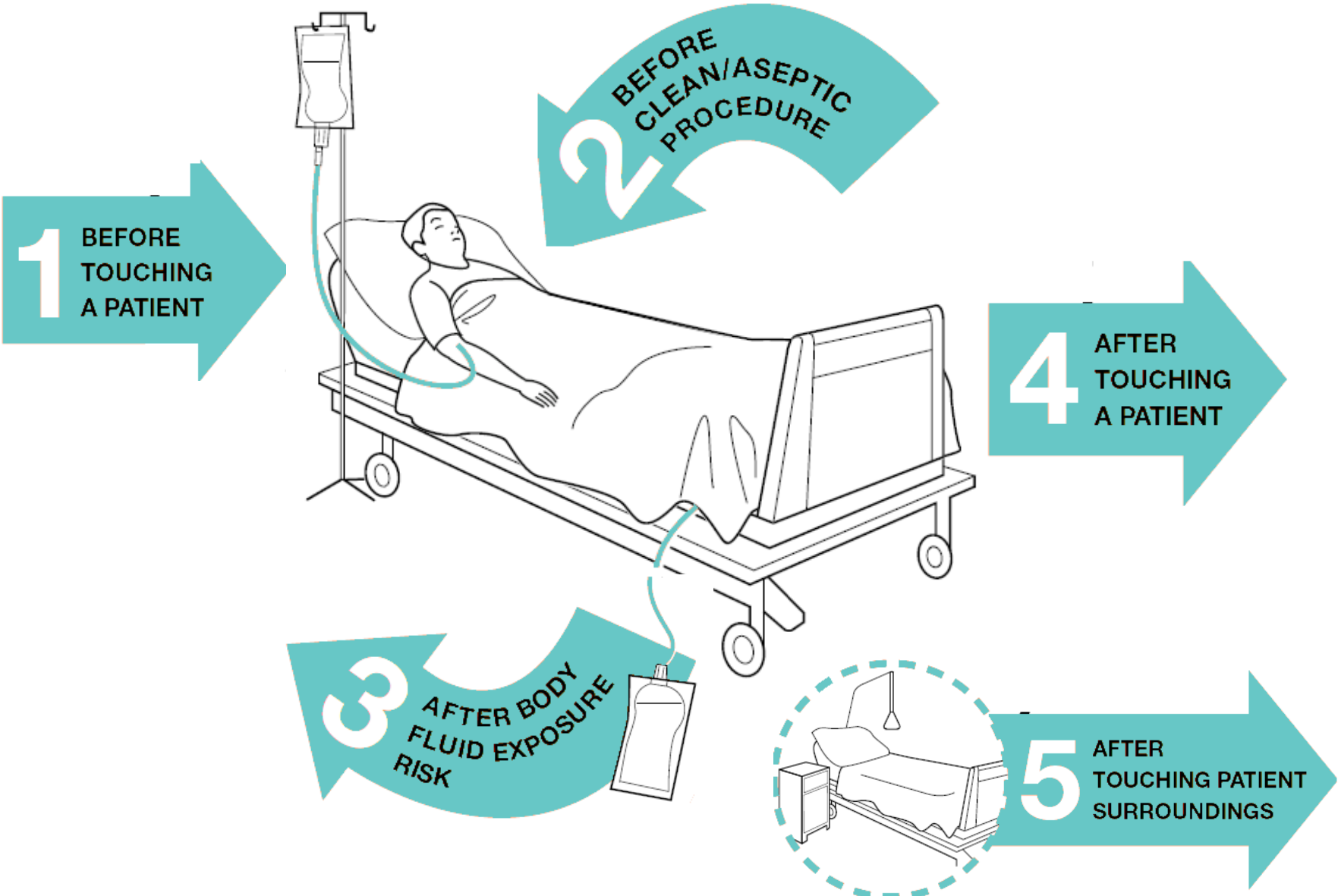


What should I do if I injured myself with a used needle?

- A. If skin is penetrated encourage the wound to bleed, ideally by **holding it under running water**
- B. **Do not squeeze** the affected area.
- C. **Wash** the affected area with **soap and water**. **Alcohol-based hand rub** can be used to clean the area if soap and water are not available.
- D. **Report the incident** immediately to your supervisor.
- E. Ask about **follow-up care**, including post-exposure prophylaxis
- F. **Complete an accident report form**, including the date and time of the exposure, how it happened, and name of the source individual (if known).



When you should wash your hands?



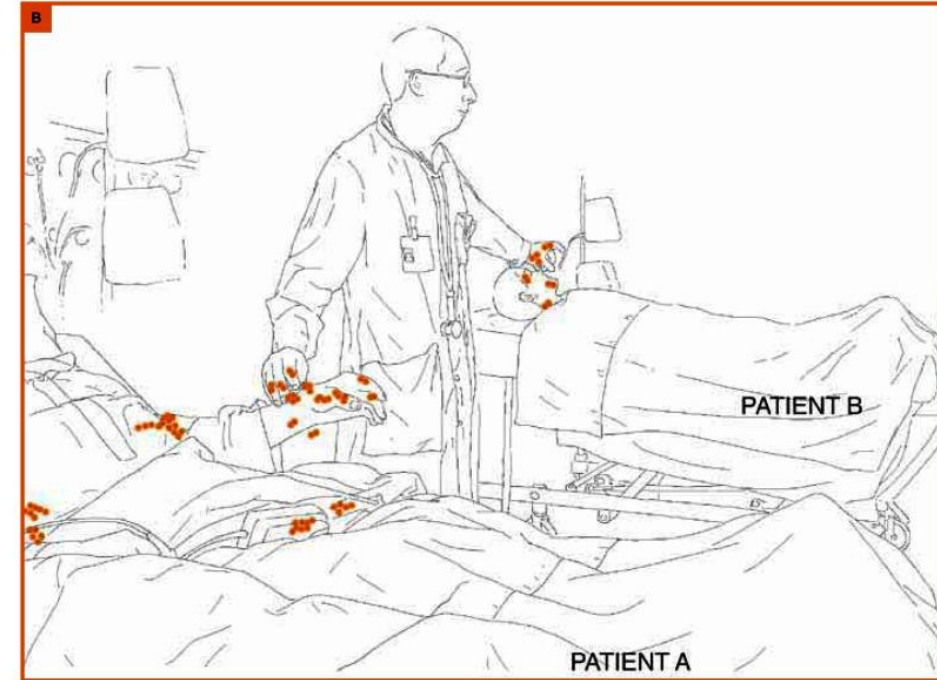
Gloves

When to wear gloves?

- When anticipated that contact with **blood or other potentially infectious materials**, **mucous membranes**, non intact skin.

Rules:

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



Proper technique to remove gloves



- Grasp outside edge near wrist.
- Peel away from hand, turning glove inside-out.
- Hold in opposite gloved hand.

- Slide ungloved finger under the wrist of the remaining glove.
- Peel off from inside, creating a bag for both gloves.
- Discard.

Gowns

Why to wear a gown?

- 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
 - Remove gown and perform hand hygiene before leaving the patient's environment
 - Do not reuse gowns, even for repeated contacts with the same patient

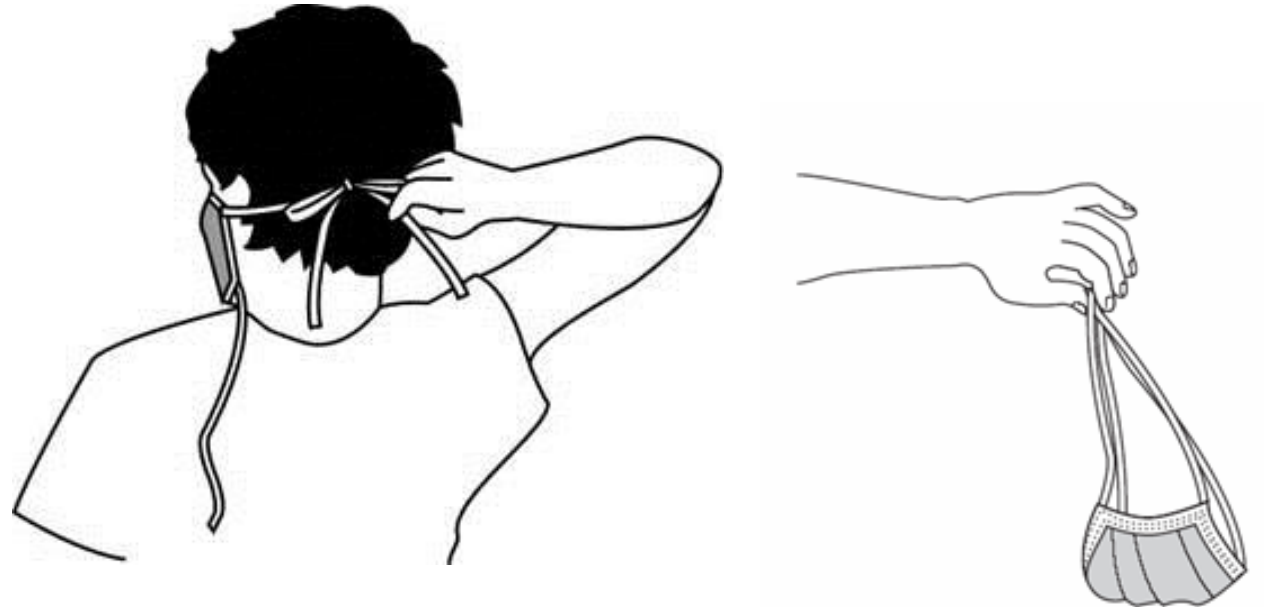


Removing Gown

- Unfasten ties
- Peel gown away from neck and shoulder
- Turn contaminated outside toward the inside
- Fold
- Discard

Removing Mask

- Untie the bottom, then top tie
- Remove from face
- Discard



Mouth, Nose, Eye Protection

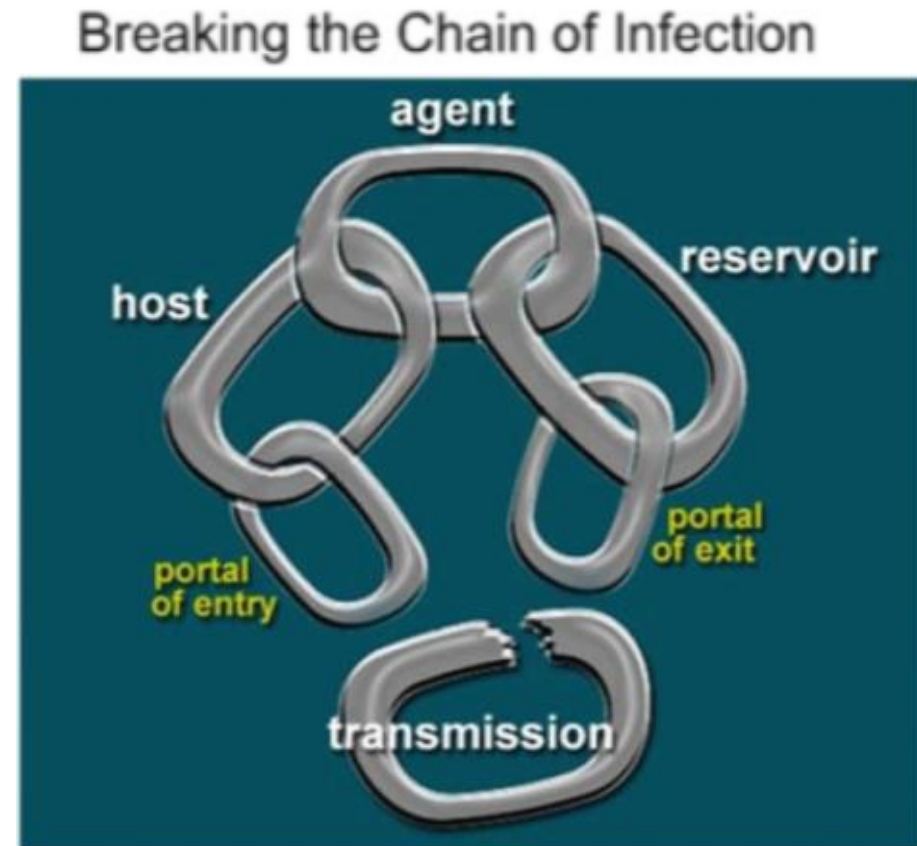
When to wear PPE to protect the mucous membranes of the eyes, nose and mouth?

- during procedures and patient-care activities that are likely to generate splashes or sprays of blood, body fluids, secretions and excretions (aerosol-generating procedures).



Transmission-Based Precautions

- Transmission-based precautions are used **in addition to standard precautions** when use of standard precautions **alone does not fully prevent** communicable disease transmission
- Types of transmission-based precautions:
 - a. **Contact precautions.**
 - b. **Droplet precautions.**
 - c. **Airborne precautions.**



Contact Precautions

“Contact organisms sticks like Vaseline to surfaces until cleaned”



Mode of transmission



Direct contact where there is skin to skin contact between two persons



Indirect contact where there is contact with an inanimate object which may serve as the vehicle for transmission of pathogens

Indication:

They are intended to prevent transmission of infectious agents which are spread by direct or indirect contact with the patient or the patient's environment

Contact Precautions

Examples include

Enteric infections with prolonged environmental survival such as	<i>C. difficile</i>
Highly contagious skin infections	scabies, impetigo, pediculosis, disseminated varicella zoster (shingles)
Resistant bacterial infections	(MRSA, VRE)
Diapered or incontinent patients with	enterohemorrhagic <i>E. coli</i> , shigella, hepatitis A, or rotavirus

Contact Precautions

1. Patient placement

- Place patients in a single-patient room when available
- When single-patient rooms are in short supply
 - Prioritize patients.
 - Cohort patients.
- If it becomes necessary to place a patient who requires Contact Precautions in a room with a patient who is not infected or colonized with the same infectious agent.
 - Avoid immunocompromised patient.
 - Ensure physical separation.
 - Change protective clothes and perform hand hygiene between contact with patients in the same room.

3. Patient transport

- limit transport and movement.
- In transportation, ensure that infected or colonized areas of the patient's body are contained and covered.
- Remove and dispose of contaminated PPE and perform hand hygiene prior to transporting patient.
- wear clean PPE to handle the patient at the transport destination.

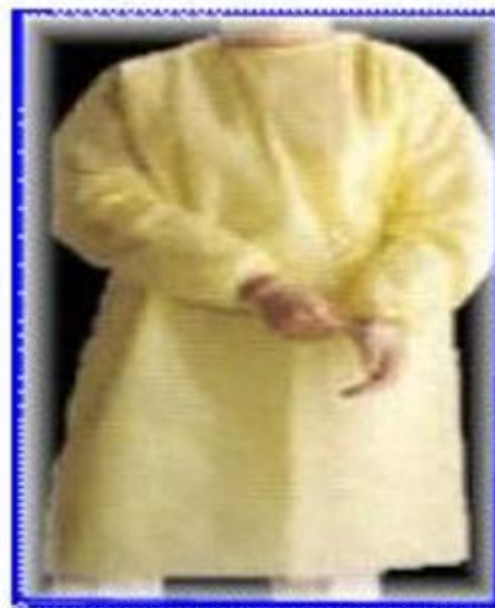
CONTACT PRECAUTIONS



Wash Hands on
Entering



Gloves



Gown



Wash Hands on
Leaving Room

Droplet Precautions



Droplet

transmission,
where large
respiratory
particles travel
up to 2 meters

Definition

Droplets can be generated from the source person during coughing, sneezing, talking and during the performance of certain procedures such as suctioning or bronchoscopy

Patient placement

The same as contact precautions

Droplet Precautions

Patient transport:

- limit transport and movement.
- Instruct patient to wear a mask and follow Respiratory Hygiene/Cough Etiquette.
- No mask is required for persons transporting patients.

Examples of Infectious agents:

- *Bordetella pertussis*.
- Influenza virus.
- Adenovirus, rhinovirus.
- *N. meningitidis*.
- Group A streptococcus

Droplet Precautions

Use of personal protective equipment



HAND HYGIENE
Before Entering
Room



GOWN AND GLOVES
REQUIRED
To Enter Room



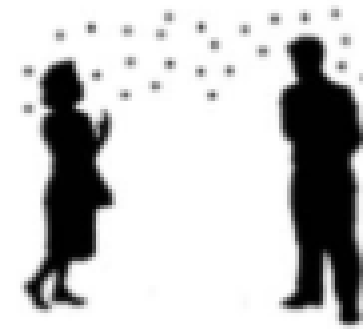
Mask with eye shield
REQUIRED
Within 6 ft of patient



HAND HYGIENE
After Exiting
Room

Abscess	Draining, major	Standard & Contact precautions	Duration of illness
	Draining, minor or limited	Standard & Contact precautions	
Adenovirus infection	• Conjunctivitis	Standard & Contact precautions	Duration of illness
	• Disseminated (2 or more sites) infection in immunocompromised host	Standard & Contact precautions	Duration of illness
	• Gastroenteritis	Standard & Contact precautions	Duration of illness
	• Respiratory infection	Standard & Droplet precautions	Duration of illness
Cellulitis (uncontrolled drainage)		Standard & Contact precautions	Duration of illness
Gastroenteritis	Cholera	Standard & Contact precautions	
	Clostridium difficile	Standard & Contact precautions	48hrs after diarrhea stops
	Rotavirus	Standard precautions Contact isolation	Duration of illness
	Shigella spp. Diapered or incontinent	Standard & Contact precautions	Duration of illness
	Viral	Standard & Contact precautions	
	Yersinia enterocolitica	Standard & Contact precautions	
Epiglottitis, due to Haemophilus influenzae type b		Standard precautions Droplet precautions	24Hrs after the initiation of effective antimicrobial therapy
Hepatitis, viral	• Type A	Standard & Contact precautions	
	• Type B, HBsAg positive, acute or chronic	Standard precautions	
	• Type C and other unspecified non-A, non-B	Standard precautions	
	• Type E	Standard & Contact precautions	
Multidrug-resistant organism, infection or colonization (e.g., MRSA, VRE, GNR, resistant Strept pneumoniae)		Standard & Contact precautions	

Airborne Precautions



Airborne
transmission
whereby small
particles travel
long distances

Airborne Precautions: **prevent** transmission of infectious agents that **remain** infectious over long distances when **suspended** in **the air**

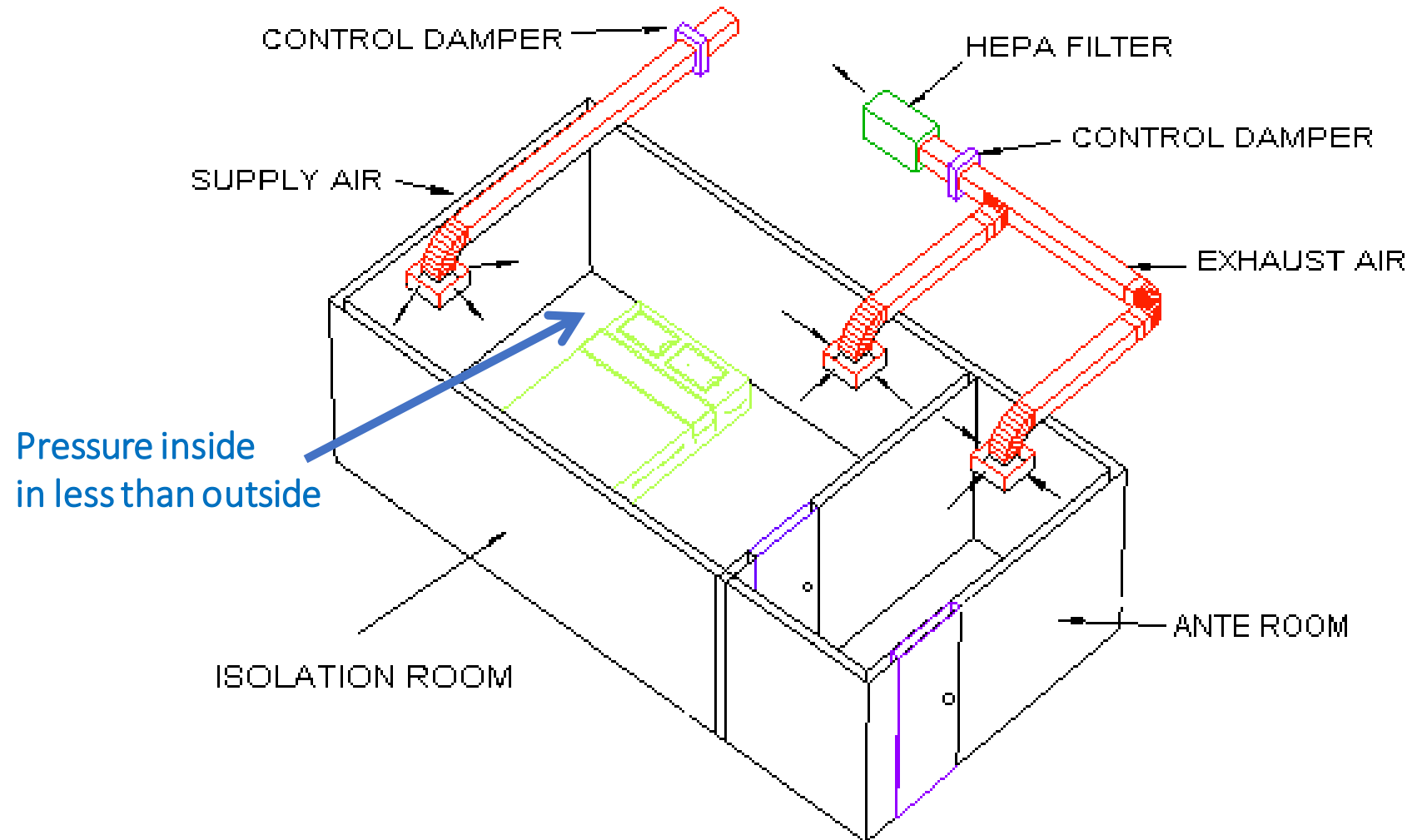
Airborne Precautions

1. Patient placement

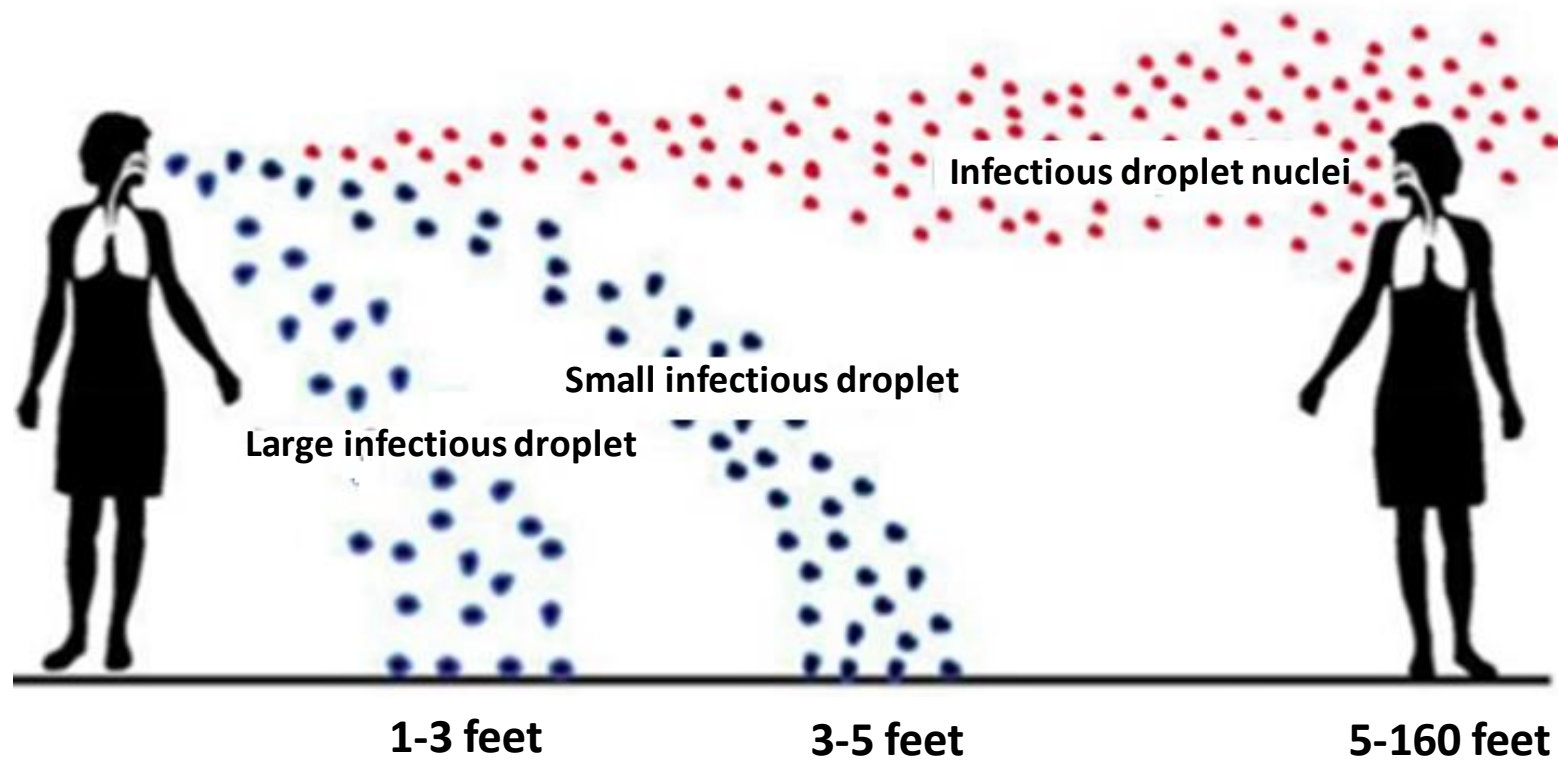
- Place patients in an **AIIR** (**A**irborne **I**nfection **I**solation **R**oom)
- An AIIR is:
 - A single-patient room
 - Equipped with special air handling and ventilation capacity
 - Monitored negative pressure.
 - Air exhausted directly to the outside or recirculated through HEPA filtration before return.

Airborne Precautions

AIIR (Airborne Infection Isolation Room)



Airborne Precautions



Airborne transmitted diseases

ملاحظات	زمن العزل	المادة المعدية	نوع المرض
الأشخاص المعرضون للعدوى الذين لا يملكون المناعة يجب ألا يدخلوا الغرفة	حتى ظهور قشرة لجميع الإصابات، وللمرضى الذين تعرضوا لخطر العدوى من 10 إلى 21 يوم بعد التعرض	إفرازات الجهاز التنفسي أو مكان الإصابة	الجديري Chickenpox
الأشخاص المعرضون للعدوى الذين لا يملكون المناعة يجب ألا يدخلوا الغرفة	فترة البقاء بالمستشفى	إفرازات مكان الإصابة	التهاب هيريس (داء المنطقة المنتشر) Disseminated Herpes Zoster
فقط الأشخاص الأكثر قابلية للعدوى يقومون بارتداء القناع، أو يبقون خارج الغرفة	لمدة 5 أيام بعد ظهور الطفح، وفي حالة ضعف جهاز المناعة للمريض فيكون زمن العزل فترة البقاء بالمستشفى	إفرازات الجهاز التنفسي	الحصية Measles (rubeola), all presentation
	فترة البقاء بالمستشفى	إفرازات مكان الإصابة	الجدري Smallpox
	كحد أدنى 14 يوم بعد بداية العلاج الكيماوي، كما يجب وجود استجابة إكلينيكية مع عدم وجود الجراثيم داخل عينات البلغم، وفي حالة ما إذا كانت العينات سلبية مع تحسن حالة المريض فيمكن أن تصبح فترة الاحتياطات 5 أيام	تنفسي - ميكروب السل	السل الرئوي Pulmonary Tuberculosis السل لبلعومي pharyngeal Tuberculosis
	فترة البقاء بالمستشفى	تنفسي	Corona virus

AIRBORNE PRECAUTIONS



PARR: powered
air purifying air
respirators (PAPR)



HAND HYGIENE
Before Entering
Room



N95/HEPA OR PAPR
Respirator Mask

REQUIRED
To Enter Room



Negative Air
Pressure

REQUIRED
Keep Door Closed



HAND HYGIENE
After Exiting
Room

CDC Transmission- Based Precautions

CONTACT PRECAUTIONS	DROPLET PRECAUTIONS	AIRBORNE PRECAUTIONS
<p>To prevent the spread of infection, ANYONE* ENTERING THIS ROOM <u>MUST</u> WEAR:</p> <p> Gloves ✓</p> <p> Gown ✓</p> <p>Applies whether or not contact with the patient or the patient's environment is anticipated.</p> <p>*Patient visitors do not need to wear gloves and a gown, but must <u>wash hands</u> upon entering and leaving this room.</p> <p><small>Updated! Please call the Department of Infection Control & Prevention at 343-2000</small></p>	<p>To prevent the spread of infection, ANYONE ENTERING THIS ROOM <u>MUST</u> WEAR:</p> <p> Surgical Mask ✓</p> <p>N-95 Respirators should <u>not</u> be used for personal protection with patients in droplet precautions.</p> <p><small>Updated! Please call the Department of Infection Control & Prevention at 343-2000</small></p>	<p>To prevent the spread of infection, ANYONE* ENTERING THIS ROOM <u>MUST</u> WEAR:</p> <p> N-95 Respirator ✓</p> <p>Also ensure that the door to the patient's room remains closed at all times.</p> <p>*Patient visitors should wear a blue surgical mask while in the patient's room.</p> <p><small>Updated! Please call the Department of Infection Control & Prevention at 343-2000</small></p>