



Infection Prevention & Control

Basic Mandatory Course

INTRODUCTION

I. Infection Control Department

II. Infection Control Committee

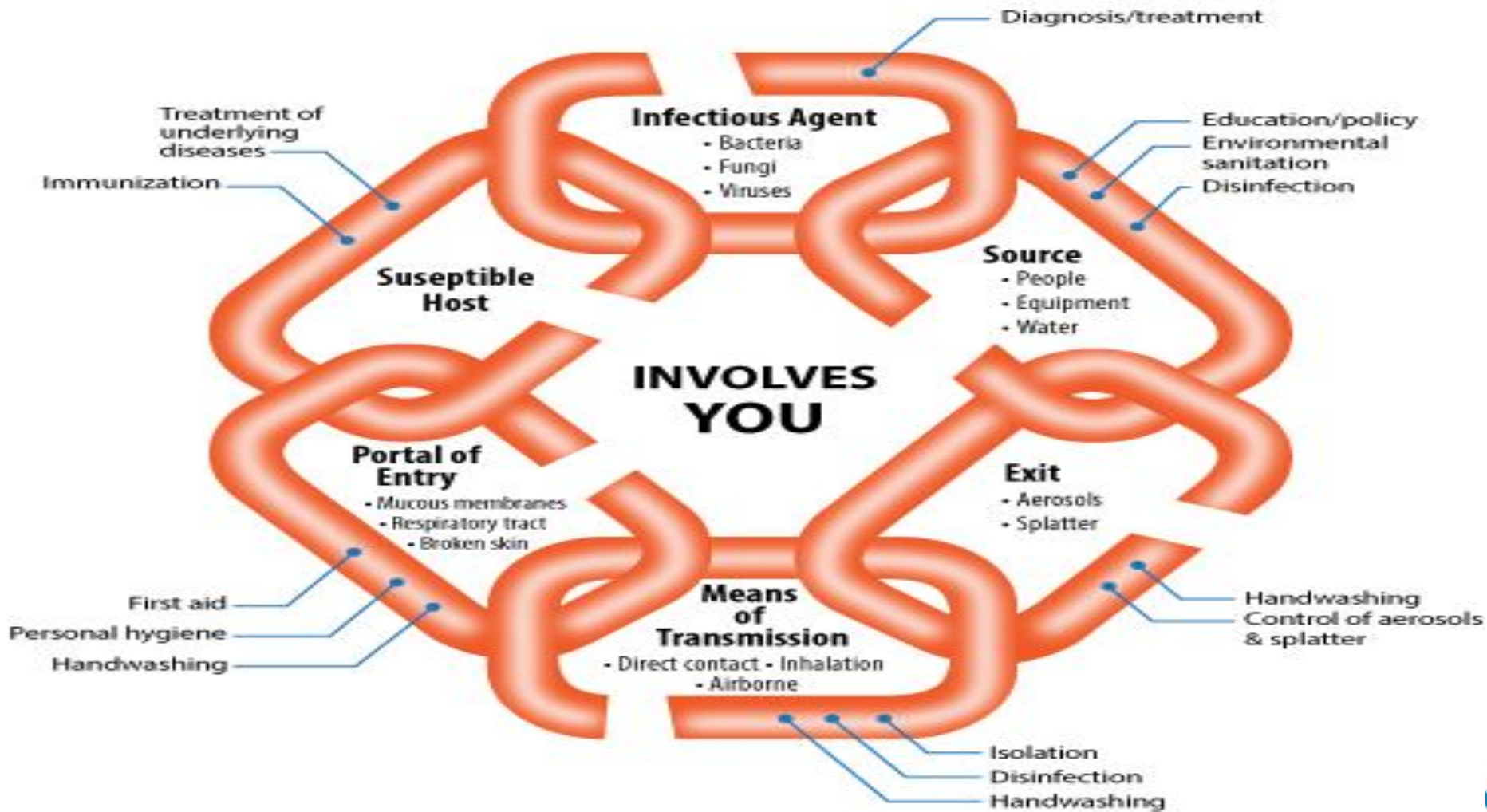
Responsibilities

1. Minimize Hospital Acquired Infection
2. Healthy Environment for Patients,Visitors,HCW
3. HCW- post-exposure prophylaxis
4. Education
5. Notification
6. HCW immunization

Responsibilities

7. Surveillance
8. Outbreak Management
9. Waste Management
10. Antimicrobial Policy
11. Coordination to MOH
12. Product Evaluation

CHAIN OF INFECTION



Definition of Infection

Presented on Admission (POA) (Community Acquired)

Infection that presented or incubating at the time of admission to the hospital at the first 2 calendar days from admission and according to each disease case definition

• Health Care - Associated (*nosocomial*)

It is presented after 2 calendar days of admission or within a defined period after hospital discharge according to the disease incubation period. We follow NHSN definition for HAI.

Categories of Nosocomial Infection

1. Surgical Site Infection (SSI)
2. Pneumonia
3. Urinary Tract Infection (UTI)
4. Bacteremia
5. Device Related Infection (VAP-
CLABSI-CA UTI)
6. Gastro – intestinal Tract Infection

HAI burden

- Hundreds of millions of patients are affected by HAI worldwide each year, leading to significant mortality and financial losses for health systems.
- Of every **100** hospitalized patients , **7** in developed and **10** in developing countries will acquire at least one HAI .
- While **UTI** is the most frequent HAI in high-income countries, **SSI** is **1/3** in settings with limited resources, (9 times higher than developed countries) .

HAI burden

- HAI annually account for 37 000 attributable deaths in Europe
- 99 000 deaths in the USA.
- Annual financial losses of,€7 billion in Europe, with 16 million extra days of hospital stay
- US\$ 6.5 billion in the USA.
- Brazil, was estimated to be equal to US\$ 18 million in 1992.
- In Mexican ICUs, US\$ 12 155/each HAI.

Patients at risk

immuno-compromised patients (oncology, dialysis, diabetic)

Prolonged hospital stay (Long stay patients)

use of invasive devices; (ICU)

Post procedures (Surgical)

ICD And Manual

- *ICITY* (INTERNT CITY)

<http://icity.ksu.edu.sa/Pages/default.aspx>



MAIN SERVICE
IC Manual

- *ICITY* (INTERNT CITY)

<http://icity.ksu.edu.sa/Pages/default.aspx>



DEPARTMENT
infection control



- refinance staff practice .
- patient education .
- IC Manual

Standard Precaution

a group of practices of infection prevention and control based on a principle that **all blood, body fluids secretions, excretions (except sweat), non intact skin and mucous membranes** may contain transmissible infectious agents regardless of their diagnosis.

Applied to **all patients** regardless of the patient diagnoses

MC-ICD-P/24

Elements Of Standard Precaution

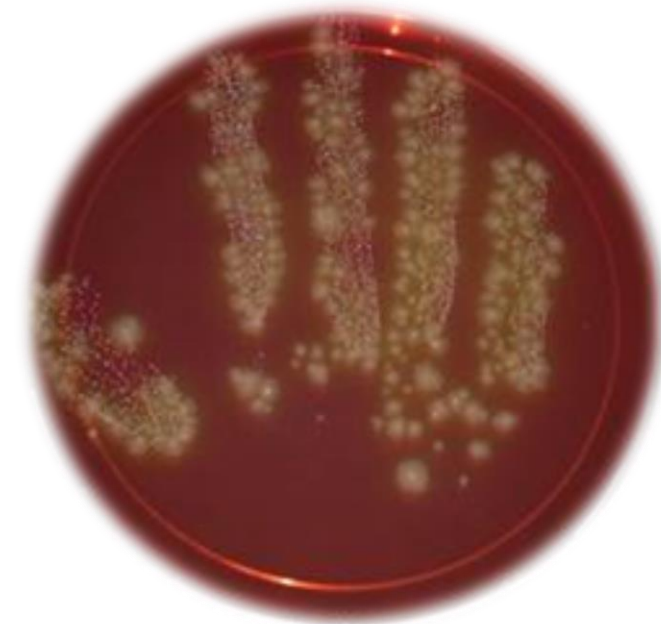
1. Hand Hygiene
2. Gown
3. Mask
4. Face Protection
5. Gloves
6. Safe injection practices
7. Patient Care Equipment/ Devices
8. Environmental Control
9. Textile and laundry
10. Worker Safety
11. Patient Placement and Transport
12. Respiratory Hygiene / Cough Etiquette
13. Infection Control Practices for Lumbar Puncture



Hand Hygiene

Healthcare-associated pathogens are most often transmitted from patient to patient through **the hands** of healthcare workers.

Hand Hygiene is **the single most important measure** for preventing the spread of microorganisms in healthcare settings. **MC-ICD-P/08**



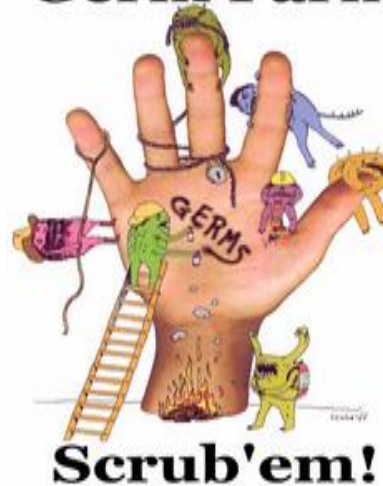
Hand Hygiene

What are our hands carrying?

Resident Flora:

- Part of body's natural defence mechanism
- Deep seated.
- Difficult to remove.
- Associated with infection following surgery/invasive procedures.

Germ Farm



Transient Flora:

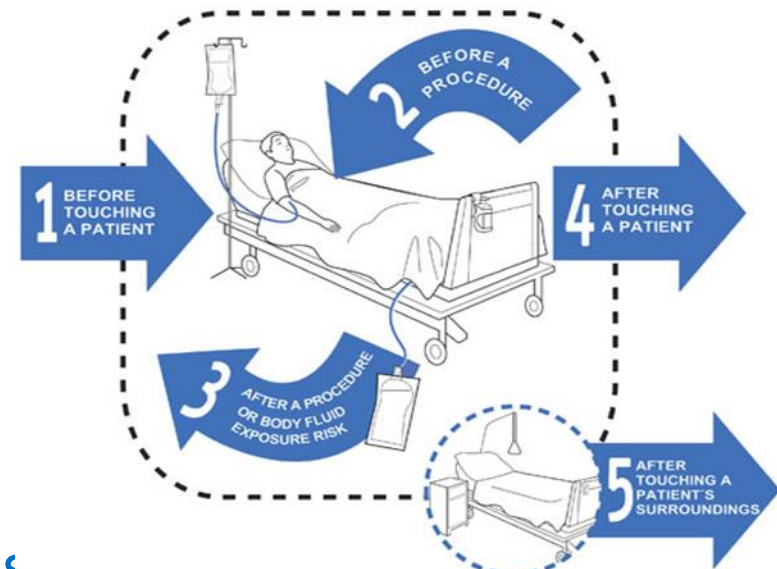
- Superficial.
- Transferred with ease to and from hands.
- Important cause of cross infection.
- Easily removed with good hand hygiene.

Routine hand hygiene removes most transient micro-organisms from soiled hands.

Hand Hygiene

WHO “My five (KEY) moments for hand hygiene”

1. Before touching a patient.
2. Before clean/aseptic procedure.
3. After body fluid exposure risk.
4. After touching a patient.
5. After touching patient surroundings.



Hand Hygiene

What , When, How ?

What are types of Hand Hygiene?

- **Hand washing.**

40-60 seconds

- ✓ for visibly soiled hands & after using alcohol gel several times
- ✓ when handling patients colonized/infected with spore-forming organisms

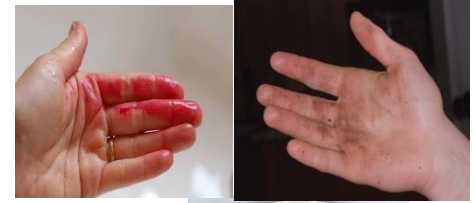
- **Use of alcohol rubs/gels.**

20-30 seconds

- ✓ for hands that are not visibly soiled.

- **Surgical hand 'scrub.**

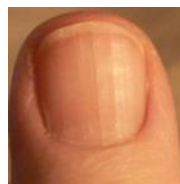
- ✓ brush and nail file
- ✓ **5 minutes** (first wash of the day); **2-3 minutes** (in between operations)



Hand Hygiene

Tips for perfect clean hands

- **Fingernails:**



Should be short, clean, and free from nail varnish as it harbour micro organisms that are not easily removed during hand hygiene.

- **Jewellery:**

For proper hand hygiene REMOVE hand ring and watch



Hand Rub

1



Rub palm to hand

2



Rub left palm over back of
right hand then vice versa

3



Rub palm to palm with
fingers interlaced

4



Rub backs of fingers in
opposing palms, with
fingers interlocked

5



Rotational rubbing of left
thumbs clasped in right
palm, then vice versa

6



Rotational rubbing, backwards,
and forwards with clasped
fingers of left hand in palm
of right and vice versa

Hand Wash



(a) Wet hands under running water



(b) Apply soap and rub palms together to ensure complete coverage



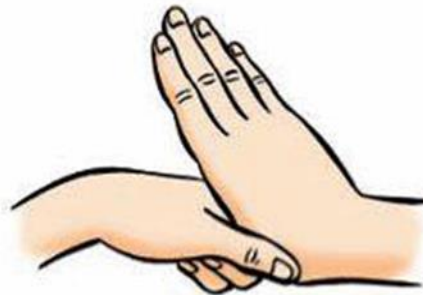
(c) Spread the lather over the backs of the hands



(d) Make sure the soap gets in between the fingers



(e) Grip the fingers on each hand



(f) Pay particular attention to the thumbs



(g) Press fingertips into the palm of each hand



(h) Dry thoroughly with a clean towel

Personal Protective Equipment

- A variety of barriers to protect both the patient and HCW's from the potential risks of cross infection whenever blood/body fluid splashes are expected to come in contact with mucous membranes, airways, skin and clothing



Glove Pyramid

STERILE GLOVES INDICATED

Any surgical procedure; vaginal delivery; invasive radiological procedures; performing vascular access and procedures (central lines); preparing total parental nutrition and chemotherapeutic agents.

EXAMINATION GLOVES INDICATED IN CLINICAL SITUATIONS

Potential for touching blood, body fluids, secretions, excretions and items visibly soiled by body fluids.

DIRECT PATIENT EXPOSURE: Contact with blood; contact with mucous membrane and with non-intact skin; potential presence of highly infectious and dangerous organism; epidemic or emergency situations; IV insertion and removal; drawing blood; discontinuation of venous line; pelvic and vaginal examination; suctioning non-closed systems of endotracheal tubes.

INDIRECT PATIENT EXPOSURE: Emptying emesis basins; handling/cleaning instruments; handling waste; cleaning up spills of body fluids.

GLOVES NOT INDICATED (except for CONTACT precautions)

No potential for exposure to blood or body fluids, or contaminated environment

DIRECT PATIENT EXPOSURE: Taking blood pressure, temperature and pulse; performing SC and IM injections; bathing and dressing the patient; transporting patient; caring for eyes and ears (without secretions); any vascular line manipulation in absence of blood leakage.

INDIRECT PATIENT EXPOSURE: Using the telephone; writing in the patient chart; giving oral medications; distributing or collecting patient dietary trays; removing and replacing linen for patient bed; placing non-invasive ventilation equipment and oxygen cannula; moving patient furniture.

Masks

DON'T TOUCH
THE FRONT OF THE MASK



Donning & Doffing

CORRECT SEQUENCE FOR DONNING PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required; e.g., Standard and Contact, Droplet or Airborne Infection Isolation.

Remove hand jewellery and tie back hair.

Clean and dry hands thoroughly.

1. GOWN / APRON

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

If you wear glasses put them on.
Place goggles or face shield over face and eyes and adjust to fit



4. GLOVES

Extend to cover wrist



CORRECT SEQUENCE FOR REMOVING PERSONAL PROTECTIVE EQUIPMENT (PPE)

1. GLOVES

Outside of gloves are contaminated—DO NOT TOUCH!

Grasp outside of glove with opposite gloved hand; peel off

Hold removed glove in gloved hand

Slide fingers of ungloved hand under remaining glove at wrist

Peel glove off over first glove

Discard gloves in waste container

Clean and dry your hands thoroughly



2. GOGGLES OR FACE SHIELD

Outside of goggles or face shield are contaminated—DO NOT TOUCH!

To remove, handle by head band or ear pieces
Place in designated receptacle for reprocessing or in waste container

Clean and dry your hands thoroughly



3. GOWN / APRON

Gown front and sleeves are contaminated—DO NOT TOUCH!

Unfasten ties

Pull away from neck and shoulders, touching inside of gown only

Turn gown inside out

Fold or roll into a bundle and discard

Clean and dry your hands thoroughly



4. MASK OR RESPIRATOR

Front of mask/respirator is contaminated—DO NOT TOUCH!

Grasp bottom, then top ties or elastics and remove

Discard in waste container

Clean and dry your hands thoroughly



Safe Injection Practices

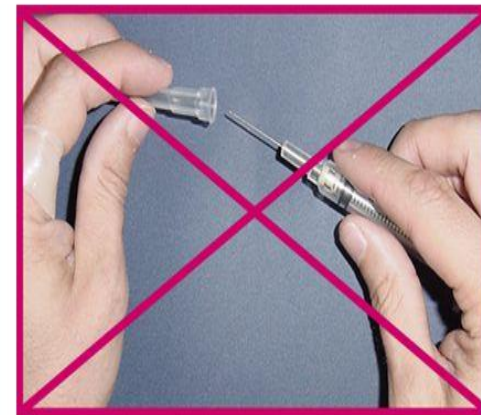
- Do not recap, bend, break, or hand-manipulate used needles.
- If recapping is required, use a one-handed scoop technique only.
- Use safety features when available.
- Place used sharps in puncture-resistant container.
- Use Single Dose vials.

1 Needle
1 Syringe
+ 1 Time

0 Infections

Finishing the Procedure

- Discard the needle in sharps container
- NEVER REUSE!!!
- NEVER RECAP!!
- Remove gloves and wash your hands



THE ONE HAND
SCOOP
TECHNIQUE

Patient Care Equipment

- Handle used patient care equipment soiled with blood, body fluids in a manner that prevents transfer of microorganisms to one's self, other patients and environments.
- Single use, disposable items must be disposed properly.
- Reusable items have to be cleaned and reprocessed appropriately, prior to use on another patient based on the manufacture recommendation and the intended use (Spaulding criteria).

Definitions

- **Cleaning:** Removal of adherent visible soil, blood, protein substances (tissue) and other debris from surfaces by mechanical or manual process.
- **Disinfection:** Destruction of most viable pathogenic microorganisms to a specific level except spores (high, intermediate, and low).
- **Sterilization:** The process by which all forms of microorganism, including bacteria, viruses, spores and fungi are destroyed.

MC-ICD-P/29,30 ,35 &41

■ **Routine Cleaning:** Hospital approved disinfectant ,

MC-ICD-P/14

AZO with Contact time **5 min.**



DesNet plus with contact time **2 min.**



■ **Special Pathogen:**

- ✓ **MDRO/ MRSA:** routine cleaning
- ✓ **VRE:** vigorous cleaning.
- ✓ **Clostridium Defficille:** Hypochlorite Releasing Products (contact time 2 min)



BLOOD Spillage Management



1

Evaluate the situation and control the source. Inform others, limit the access to the spillage area and immediately clean and disinfect.

2

Use protective PPE (gloves, gowns, goggles/face shield, mask).

3

Cover spillage with hypochlorite (PRESEPT) solution 10,000 ppm. leave it for the appropriate contact time (2-5 minutes/according to manufactural recommendation).

4

Mop up excess with paper towels and dispose in yellow bag.

5

Clean the area thoroughly with detergent solution. Dispose of protective clothing into yellow bag. Do hand wash perfectly.

Blood spillage



MC-ICD-P/01

Worker Safety

- **Prevention of sharps-related injuries.**
- **Precautions during aerosol-generating procedures.**
- **Prevention of mucous membrane contact.**



Cough Etiquette

COVER UP

COUGHING AND SNEEZING



- Turn your head away from others
- Use a tissue to cover your nose and mouth



- Drop your tissue into a waste bin



- No tissues? Use your sleeve



- Clean your hands after discarding tissue using soap and water or alcohol gel for at least 15 seconds

STOP
the **SPREAD**



Waste Disposal

Health Care Non-Risk Waste

For Example:

- Paper / packaging materials
- Food
- Cups, plates, utensils
- Syringe with no needle non-contaminated with blood / body fluids
- Plastic bottles
- Feeding Formula bottles/plastic
- Tissue paper
- Diaper not contaminated with blood
- PPE not contaminated with blood/ body fluid
- IV fluid bags with line not contaminated with blood



Health Care Risk Waste (Infectious Waste)

For Example:

- Gauze / dressing materials
- IV fluid lines contaminated with blood
- Foley's Cath & Urinary bag
- Nasogastric tube
- Endotracheal tube
- Thermometer probe
- PPE contaminated with blood & body fluids
- Drain tubes & bags
- Suction catheter
- Sputum container
- Test tubes & universal containers containing specimens



Health Care Risk Waste (Pathological Waste)

Pathological Waste (for example)

- Placenta
- Body parts
- Human fetus



Health Care Risk Waste (Sharps Waste)

For Example:

- Slides, broken vials & ampules
- Lancets
- Syringe with needle
- Cannula needles
- Scalpels
- Blades
- Needles
- Butterfly needle
- Saw



Note: Don't re-cap the needles

TRANSMISSION-BASED PRECAUTIONS

Airborne Precautions

Droplet Precautions

Contact Precautions

AIRBORNE PRECAUTIONS



Causative agents of diseases under airborne precaution are less than 5 μm , thus can be carried away by air currents

DISEASES UNDER AIRBORNE PRECAUTION

- Measles
- Tuberculosis
(Pulmonary/Laryngeal)
- Varicella

AIRBORNE PRECAUTIONS

Patient Placement

- Single room with negative air pressure
- 12 air exchanges per hour (MOH)
- Room door closed
- MC-ICD-P/43

AIRBORNE PRECAUTIONS

Protection for HCW

- ✓ Standard Precautions
- ✓ N95 respirator



Patient Transport

- ✓ Limit movement
- ✓ Mask the patient with surgical mask



AIRBORNE PRECAUTIONS

- N95 mask is single use



FIT TEST



MC-ICD-P/26

For Airborne Precautions

- N95 respirator



Well sealed check



MC-ICD-P/05

Powered Air purifying respirator (PAPR)



AIRBORNE PRECAUTIONS

احتياطات الأمراض المنقولة عن طريق الهواء

PLEASE, follow the following instructions...

الرجاء اتباع التعليمات الآتية ...

Hand Hygiene

الاهتمام بنظافة اليدين



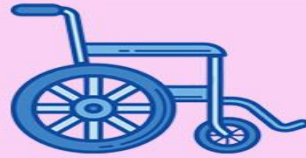
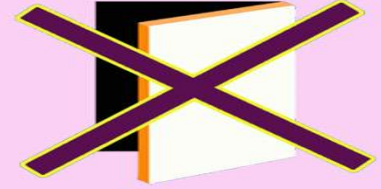
Wear N95 MASK

ارتداء القناع التنفسي الواقي



Keep the door shut

الحفاظ على الباب مغلقا



Patient Transport, ONLY IF NECESSARY with surgical mask

لا يُنقل المريض إلا عند الضرورة وعند نقله يُراعى استخدام القناع الواقي.

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AIRBORNE PRECAUTIONS

Display sign outside the door. Remove sign after room is cleaned.

Common Conditions:

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• Pulmonary or Laryngeal Tuberculosis• Chicken Pox• Disseminated Herpes Zoster (Shingles) | <ul style="list-style-type: none">• Rubeola (Measles)• Avian Influenza |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|

Family and other visitors to follow precautions

Airborne Infection Isolation Room

- Use Airborne Isolation room. Nurse to notify Infection Control Preventionist and Facilities/Engineering of room number when starting and stopping precautions

Dishes / Utensils:

- No special precautions. Kitchenware sanitized in dishwasher.

Equipment / Supplies:

- Use dedicated or disposable equipment when available.
- Clean and disinfect reusable equipment including IV pumps, cell phone, or pagers (if used in room), other electronics, supplies and equipment prior to removing from patient's room.
- Ensure blood pressure cuff and stethoscope are cleaned and disinfected between patients.
- Only essential supplies in room.

Linen Management:

- Bag linen in the patient's room.

Patient Identification Procedure:

- Use patient's label for validation of patient identity and destroy in room after use.

Personal Protective Equipment (PPE)

Put ON in order:

1. Wash or sanitize hands
2. Fitted N-95, 99, 100 respirator or PAPR required

Take OFF & dispose outside room, in order

1. Fitted N-95, 99, 100 respirator or PAPR
2. Wash or sanitize hands (even if gloves used)

Room Cleaning:

- After patient is discharged, keep door closed for one hour to allow complete room air exchange before routine cleaning procedures. Change cubicle curtain if visibly soiled.

Transport:

- Essential transport only and place surgical mask on patient. Clean and disinfect transport vehicle. Alert receiving department regarding patient's isolation precaution status.
- Discontinue precautions as per hospital policy or Infection Preventionist Instructions.

ISOLATED Patient Transfer

STOP

sufficient information
on the patients
infection status
must be given to
the receiving area.

Following transport,
trolleys/ chairs
should be disinfected.

AIRBORNE PRECAUTIONS



Hand Hygiene

Mask the patient
With surgical mask
before transfer.



Wear PPEs
N95 RESPIRATOR

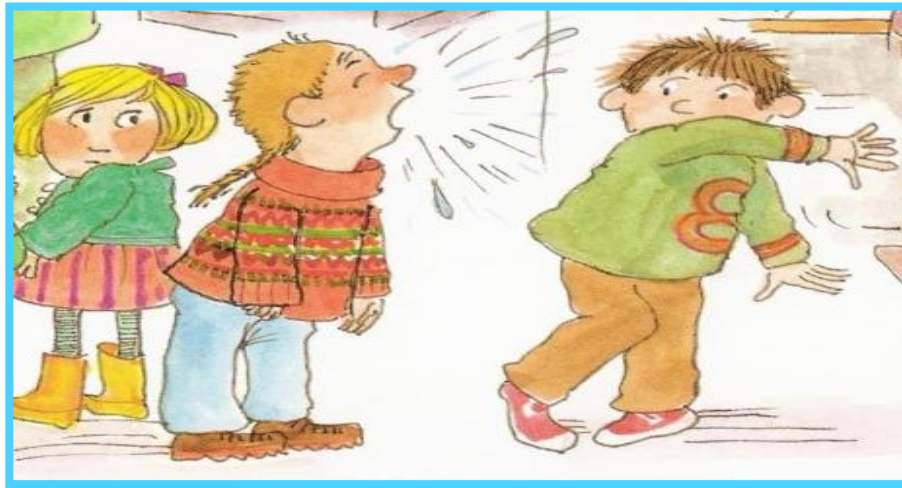


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DROPLET PRECAUTIONS



Causative agents of diseases under droplet precaution are greater than $5 \mu\text{m}$. They can travel up to 3 feet (1mtr)

DISEASES UNDER DROPLET PRECAUTION

Haemophilus influenzae type B
disease, including meningitis,
pneumonia, epiglottitis and sepsis

Streptococcal (group A)
pharyngitis, scarlet fever in
infants and young children

Influenza, Mumps

DROPLET PRECAUTIONS

Patient placement

- Private room
- Cohort nursing

DROPLET PRECAUTIONS

Protection for HCW

- Standard precautions
- Surgical mask if working within 3 feet of the patient

Patient Transport

- Limit movement
- Mask the patient with surgical mask



DROPLET PRECAUTIONS

احتياطات الأمراض المنقولة عن طريق الهواء

PLEASE, follow the following instructions...

الرجاء اتباع التعليمات الآتية...

Hand Hygiene

الاهتمام بنظافة اليدين



Wear Surgical Mask

ارتداء القناع الواقي



Patient Transport, ONLY IF NECESSARY with surgical mask

لا يُنقل المريض إلا عند الضرورة وعند نقله يُراعى استخدام القناع الواقي.

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DROPLET PRECAUTIONS

Display sign outside the door. Remove sign after room is cleaned.

Common Conditions:

- Seasonal Influenza
- Bacterial Meningitis (N. meningitides)
- Pertussis (Whooping Cough)
- Mumps

Family and other visitors to follow precautions

Dishes / Utensils:

- No special precautions. Kitchenware sanitized in dishwasher.

Equipment / Supplies:

- Use dedicated or disposable equipment when available.
- Clean and disinfect reusable equipment including IV pumps, cell phone, or pagers (if used in room), other electronics, supplies and equipment prior to removing from patient's room.
- Ensure blood pressure cuff and stethoscope are cleaned and disinfected between patients.
- Only essential supplies in room.

Linen Management:

- Bag linen in the patient's room.

Patient Identification Procedure:

- Use patient's label for validation of patient identity and destroy in room after use.

Personal Protective Equipment (PPE)

Put ON in order:

1. Wash or sanitize hands
2. Gown (if needed)
3. Mask
4. Eye cover
5. Gloves (if needed)

Take OFF & dispose outside room, in order

1. Gloves (if used)
2. Eye cover
3. Gown (if used)
4. Mask
5. Wash or sanitize hands (even if gloves used)

Private Room:

- If not available, room with patient that has the same organism but no other infection.

Transport:

- Essential transport only and place surgical mask on patient. Clean and disinfect transport vehicle. Alert receiving department regarding patient's isolation precaution status.
- Discontinue precautions as per hospital policy or Infection Preventionist Instructions.

ISOLATED Patient Transfer

STOP

sufficient information
on the patients
infection status
must be given to
the receiving area.

Following transport,
trolleys/ chairs
should be disinfected.

**Wear PPEs.
Surgical Mask**



Hand Hygiene

DROPLET PRECAUTIONS



**Mask the patient
With surgical mask
before transfer..**



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CONTACT PRECAUTIONS



Use In addition to standard precaution, for patients known or suspected to have serious illness transmitted through contact

CONTACT PRECAUTIONS

- Direct Contact Transmission



In-Direct Contact



DISEASES UNDER CONTACT PRECAUTION

- Multi-drug resistant microorganisms (MDRO's), VRE, MRSA, ESBL, *B. cepacia*
- RSV infection in infants, young children and immunocompromised patients
- *Clostridium difficile* enterocolitis

CONTACT PRECAUTIONS

Patient placement

- Private room
- Cohort nursing

CONTACT PRECAUTIONS

Protection for HCW

- Handwashing
- Gloves
- Gown

Patient Transport

- Limit movement





CONTACT PRECAUTIONS

احتياطات الأمراض المنقولة عن طريق التلامس

PLEASE, follow the following instructions...

الرجاء اتباع التعليمات الآتية ..

Hand Hygiene

الاهتمام بنظافة اليدين



Gowns & Gloves

ارتداء القفاز والمعطف الأصفر



Dedicated Patient Equipment

تخصيص أدوات للمريض



Patient Transport, ONLY IF NECESSARY, Contain any drainage/cover wounds.

لا يُنقل المريض إلا عند الضرورة وعند نقله يُراعى تغطية أي جرح مكشوف أو درنمة.

CONTACT PRECAUTIONS

Display sign outside the door. Remove sign after room is cleaned.

Common Conditions:

- Multi-Drug Resistant Organism
 - ✓ Methicilline Resistant Staphylococcus Aureus (MRSA)
 - ✓ Vancomycin Resistant Enterococcus (VRE)
- Clostridium Difficile Infection (C. Diff)
- Scabies
- Wounds or abscesses with uncontained drainage

Family and other visitors to follow precautions

Dishes / Utensils:

- No special precautions. Kitchenware sanitized in dishwasher.

Equipment / Supplies:

- Use dedicated or disposable equipment when available.
- Clean and disinfect reusable equipment including IV pumps, cell phone, or pagers (if used in room), other electronics, supplies and equipment prior to removing from patient's room.
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Personal Protective Equipment (PPE)

Put ON in order:

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3. Mask (if needed)
4. Eye cover (if needed)
5. Gloves

Take OFF & dispose outside room, in order

1. Gloves
2. Eye cover (if used)
3. Gown
4. Mask (if used)
5. Wash or sanitize hands (even if gloves used)

Private Room:

- If not available, room with patient that has the same organism but no other infection.

Transport:

- Essential transport only. Place patient in clean gown. Clean and disinfect transport vehicle. Alert receiving department regarding patient's isolation precaution status.
- Discontinue precautions as per hospital policy or Infection Preventionist Instructions.

ISOLATED Patient Transfer

STOP

sufficient information
on the patients
infection status
must be given to
the receiving area.

Following transport,
trolleys/ chairs
should be disinfected.

Wear PPEs.
Gown & Gloves



Hand Hygiene

CONTACT PRECAUTIONS



contain the patient's
source of infection
before transfer.

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EMPIRIC ISOLATION PRECAUTIONS

- The risk of infection transmission may be highest before a definitive diagnosis can be reached
- Therefore, patients with certain clinical syndromes should be isolated empirically until we have a definitive diagnosis.

