Infection Prevention and Control (IPC) for COVID-19

3 April 2020

Learning Objectives

- Introduction: HAI and IPC
- IPC strategies for COVID-19
  - Standard precautions
  - Triage, Early identification and source control
  - Additional precautions
  - Additional control measures
- Environmental cleaning and disinfection
- Biomedical waste management

Healthcare Associated Infections & Infection Prevention and Control

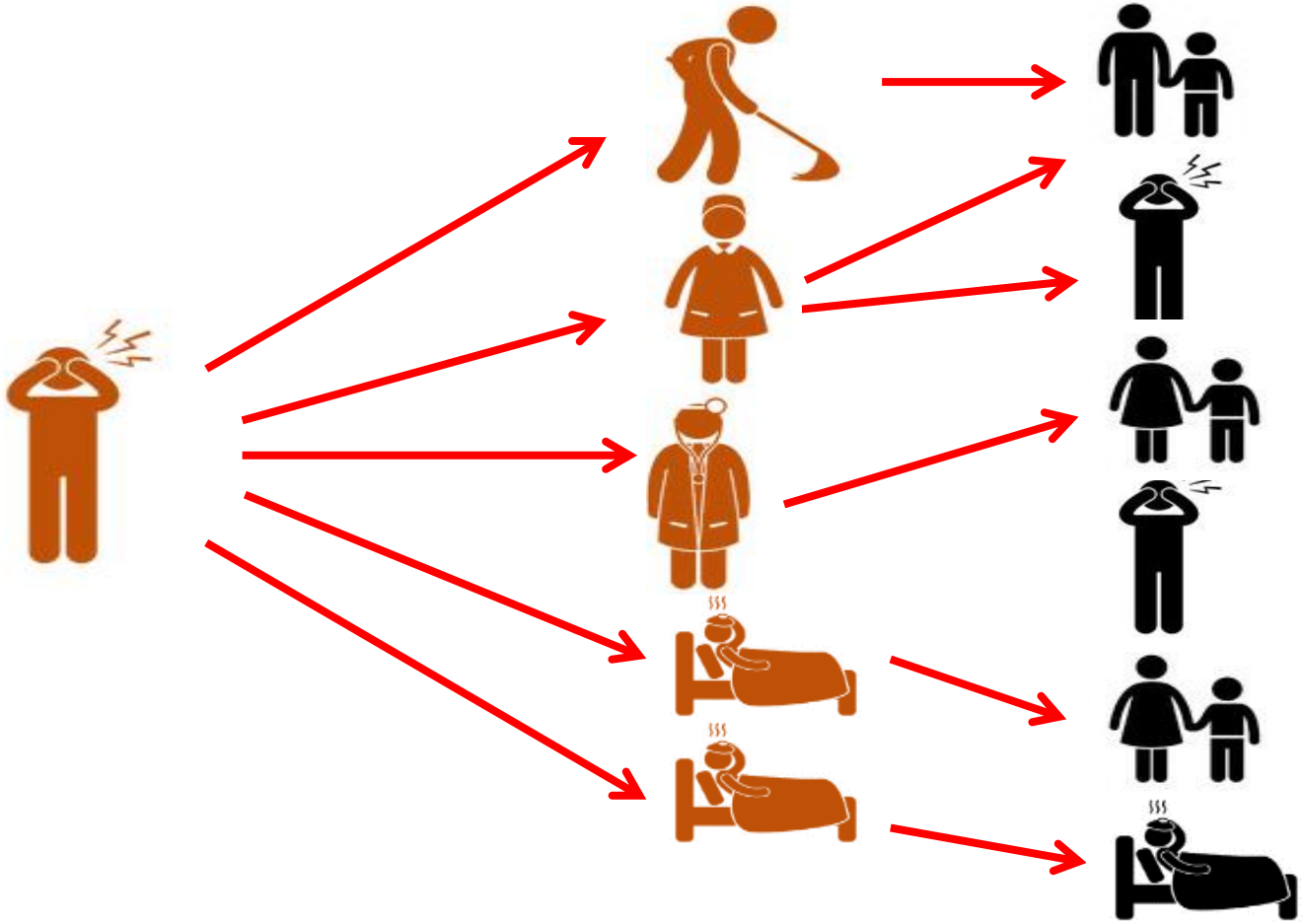
- **Healthcare associated infections (HAI) are** the most common adverse events in healthcare delivery and a major public health problem with an impact on morbidity, mortality and quality of life
- Large percentage of HAI are preventable through effective IPC measures
- These measures are essential for the well being and safety of patients, their families, health workers and the community
- **First step towards implementing IPC** is establishment of **IPC programme** and **Hospital Infection Control Committee (HICC)** at the healthcare facility (HCF)
- **HICC:**
  - Chaired by senior administrator
  - Representation from all relevant disciplines and departments
  - Responsible for establishing and implementing the IPC programme in the HCF

Infection Prevention and Control Program

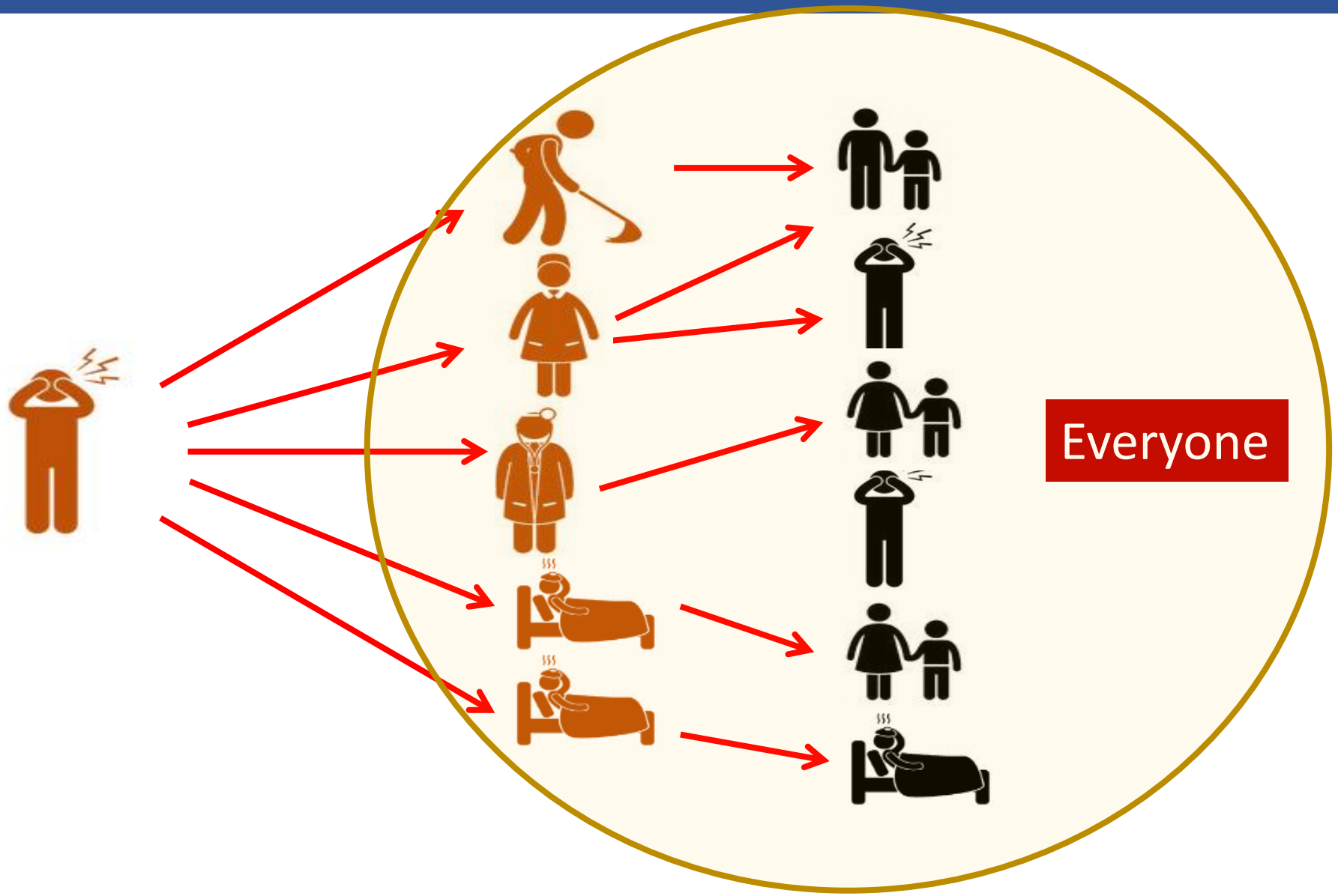
IPC programme includes but is not limited to

- Action plan for strengthening IPC for facility and individual units based on risk assessment of that unit e.g. annual action plan
- Constitute an IPC team responsible for the day to day activities
- Review and revise IPC guidelines on a regular basis
- Organise training programmes for IPC staff and HCWs
- Develop antibiotic policy and antibiotic stewardship program
- Conduct surveillance of HAI, analyse data and investigate outbreaks if any and evaluate effectiveness of IPC interventions

WHO is at Risk?



WHO is at Risk?



Benefits of IPC

Protecting yourself

Protecting your patients

Protecting your family, community & environment

IPC Goals in Outbreak Preparedness

1. **To reduce transmission of healthcare associated infections**
2. **To enhance the safety of staff, patients and visitors**
3. **To enhance the ability of the organization/health facility to respond to an outbreak**
4. **To lower or reduce the risk of the hospital (health care facility) itself amplifying the outbreak**

Roles and Responsibilities of HICC team members

- Knowledge: have an understanding of the IPC strategies needed for outbreaks/epidemics, etc
- Policy and SOP development
- Assessment, preparedness and readiness
- Coordinate patient Triage
- Participate in response and recovery
- Participate in surveillance & monitoring
- Patient management
- Infrastructure for patient management
- Education

IPC strategies

The basics about Covid-19: what it is

- The cause: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), made of 4 proteins and a strand of RNA
- The disease: Coronavirus disease 2019 (COVID-19)
- Modes of transmission of COVID-19 virus (based on current evidence):
  - Primarily transmitted between people through respiratory droplets and contact routes
    - Droplet transmission occurs when a person is in close contact (within 1 m) with some one who has respiratory symptoms (e.g. coughing/sneezing)
    - Risk of having his/her mucosae (mouth or nose) or conjunctiva exposed to potentially infective respiratory droplets
  - Transmission may also occur through fomites in the immediate environment around the infected person that is
    - Direct contact with infected people
    - Indirect contact with surfaces in the immediate environment or with objects used on the infected person (e.g. stethoscope, thermometer)
  - Airborne transmission may be possible in specific circumstances in which procedures or support treatments that generate aerosols are performed e.g. endotracheal incubation, open suctioning, manual ventilation before intubation, non-invasive positive pressure ventilation, tracheostomy, and cardiopulmonary resuscitation.

Strategies for preventing/limiting spread of COVID-19

- Applying standard precautions for all patients at all times
- Ensuring triage, early recognition and source control
- Implementing empiric additional precautions for suspected cases of COVID-19 infection
- Implementing administrative controls
- Implementing environmental and engineering controls

Standard Precautions

Standard Precautions

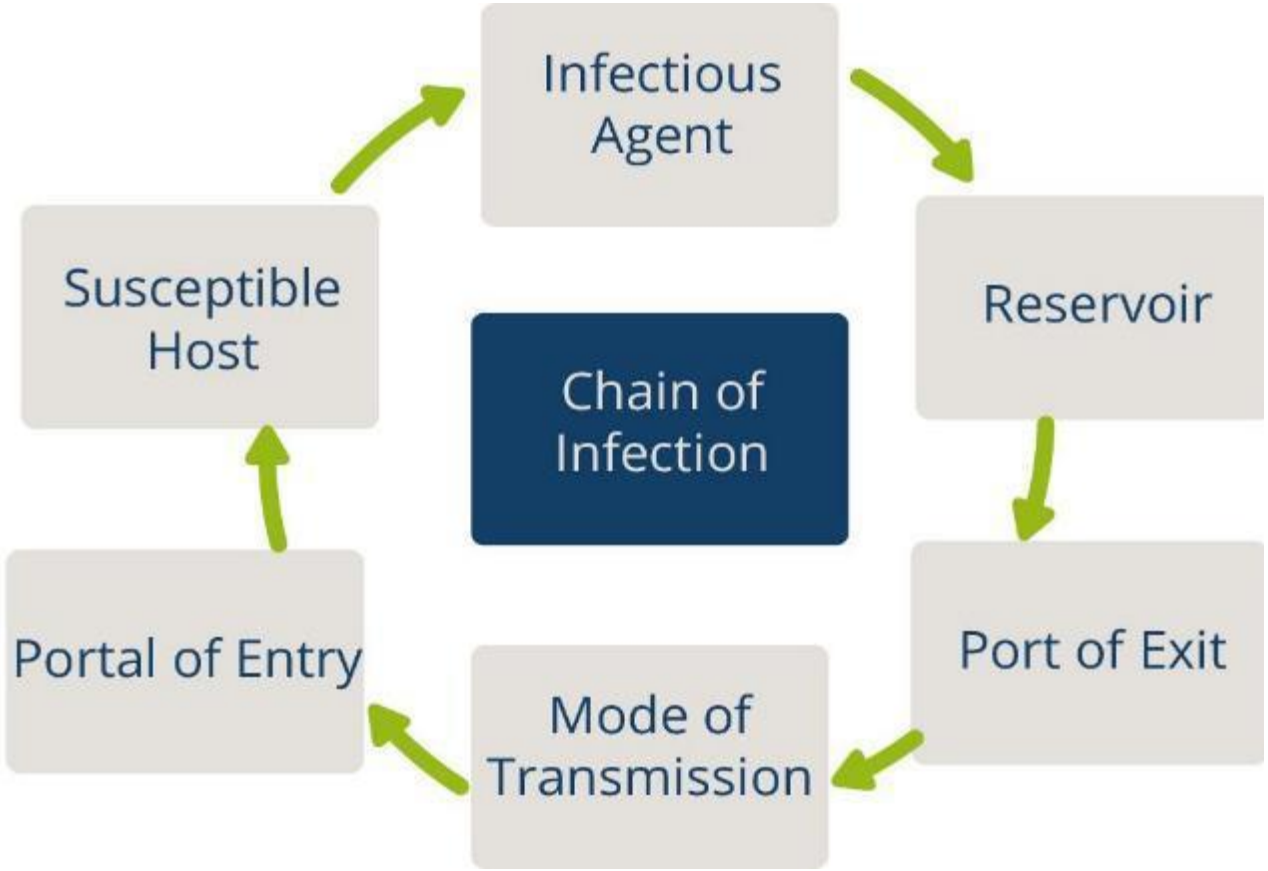
- The **basic level of IPC precautions**, to be used for **ALL** patients at **ALL** times regardless of suspected or confirmed status of the patient

- **Risk assessment** is critical for all activities i.e. assess each health care activity and determine the personal protective equipment (PPE) that is needed for adequate protection

Elements of Standard Precautions

1. Hand hygiene
2. Respiratory hygiene (cough etiquette)
3. PPE according to the risk
4. Safe injection practices, sharps management and injury prevention
5. Safe handling, cleaning and disinfection of patient care equipment
6. Environmental cleaning
7. Safe handling and cleaning of soiled linen
8. Waste management

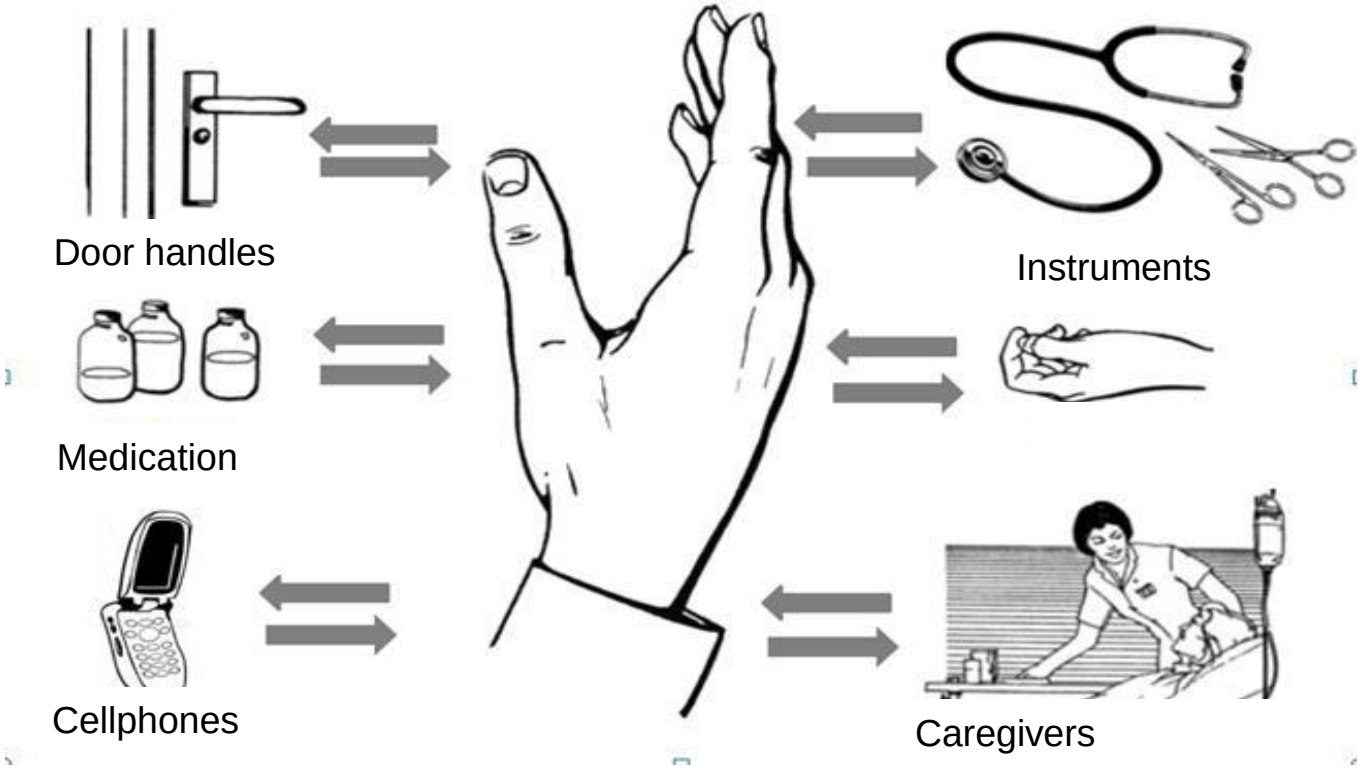
Chain of Transmission



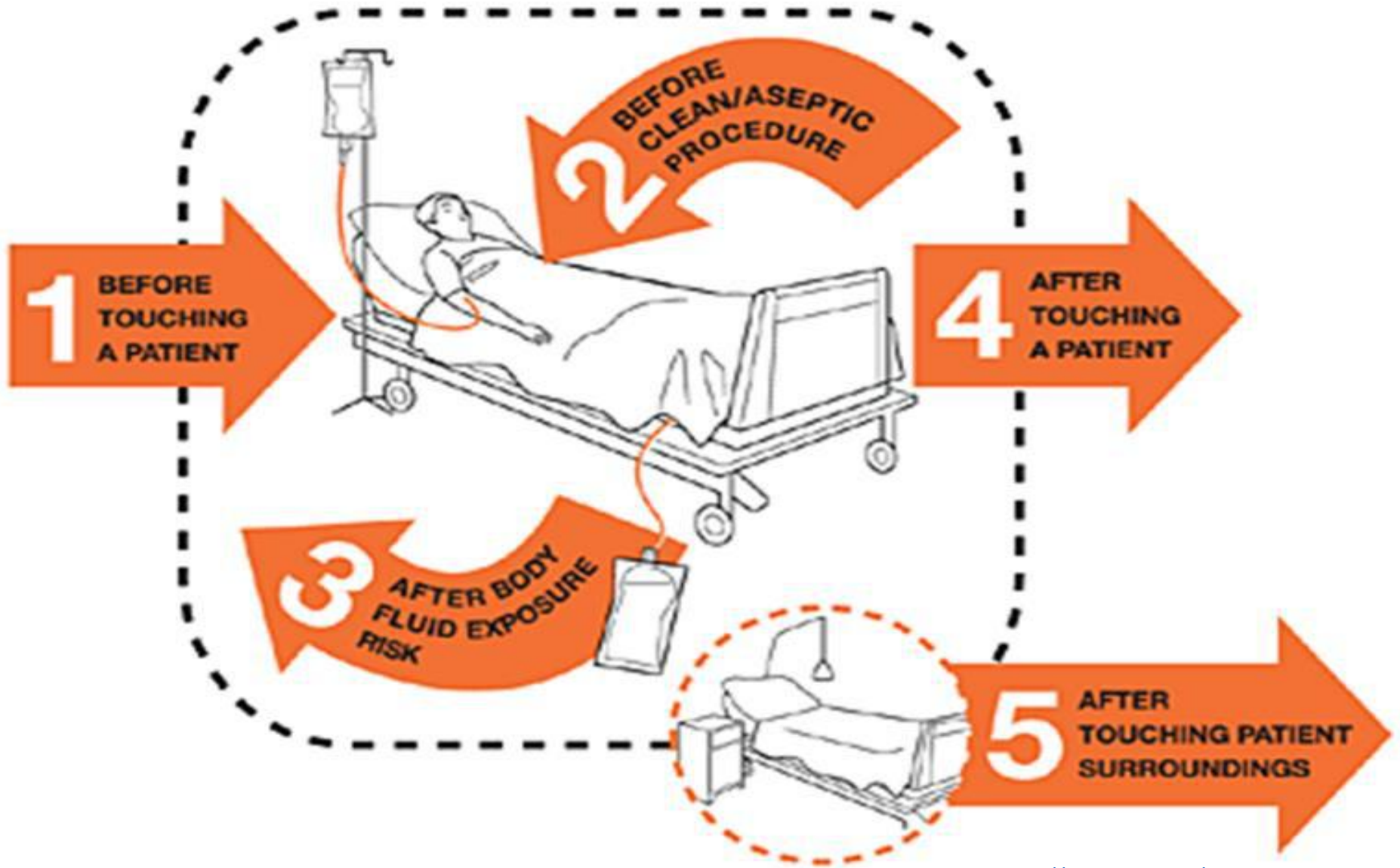
- For an infection to spread, **all links must be connected**
- **Breaking any one link,** will **stop disease transmission!**

Hand Hygiene

- Best way to prevent the spread of germs in the health care setting and community
- Our hands are our main tool for work as health care workers- and they are the key link in the chain of transmission

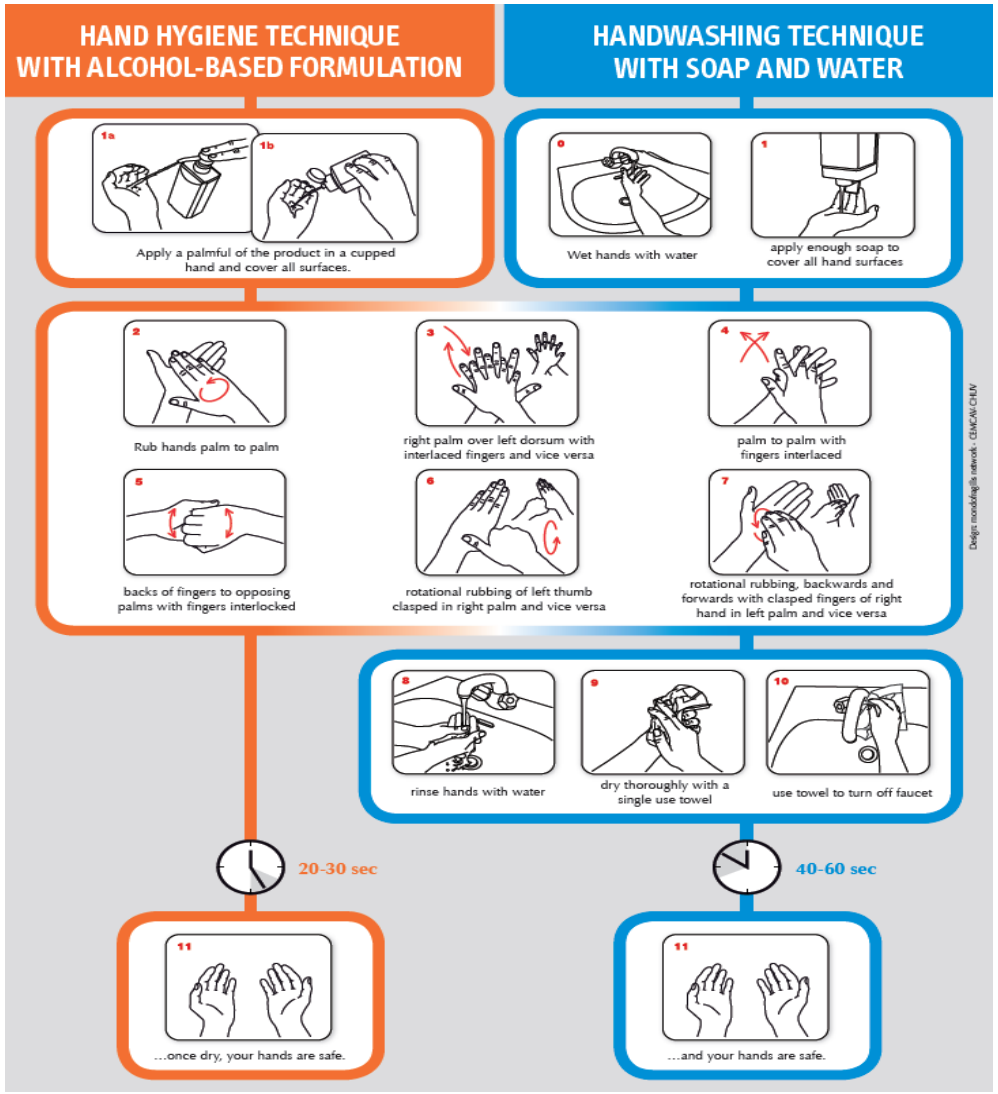


Hand **Hygiene: WHO Five moments**



https://www.who.int/infection-prevention/tools/hand-hygiene/en/

Hand Hygiene: How to Wash Hands?



- Use appropriate product and technique
- **<u>Soap and water</u>**
  - **Wash hands for 40–60 seconds!**
- **<u>Alcohol-based hand rub</u>** when tap and running water is not available
  - **Rub hands for 20–30 seconds!**

When hands are visibly dirty or contaminated with proteinaceous material, always use soap, running water and single use towel

https://www.who.int/infection-prevention/tools/hand-hygiene/en/

How to handrub?

RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

Duration of the entire procedure: 20-30 seconds

Apply a palmful of the product in a cupped hand, covering all surfaces;

Rub hands palm to palm;

Right palm over left dorsum with interlaced fingers and vice versa;

Palm to palm with fingers interlaced;

Backs of fingers to opposing palms with fingers interlocked;

Rotational rubbing of left thumb clasped in right palm and vice versa;

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

Once dry, your hands are safe.

How to handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

Duration of the entire procedure: 40-60 seconds

Wet hands with water;

Apply enough soap to cover all hand surfaces;

Rub hands palm to palm;

Right palm over left dorsum with interlaced fingers and vice versa;

Palm to palm with fingers interlaced;

Backs of fingers to opposing palms with fingers interlocked;

Rotational rubbing of left thumb clasped in right palm and vice versa;

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

Rinse hands with water;

Dry hands thoroughly with a single use towel;

Use towel to turn off faucet;

Your hands are now safe.

https://www.who.int/infection-prevention/tools/hand-hygiene/en/

Respiratory hygiene (cough etiquette)

- All persons with signs and symptoms of a respiratory infection (regardless of presumed cause) must follow respiratory hygiene/cough etiquette
  - Cover nose and mouth with tissue when coughing or sneezing
  - Dispose of tissues in the nearest waste receptacle after use immediately
  - Perform hand hygiene after contact with respiratory secretions and contaminated objects/materials
  - In absence of tissue/handkerchief patient to be instructed to cover their nose and mouth with arm with elbows flexed during coughing/sneezing
  - Do not spit here and there

Image source: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public

Ensure availability of materials for Cough etiquette

- Ensure availability of materials for adhering to respiratory hygiene/cough etiquette in waiting areas for patients and visitors:
  - **Provide face masks for symptomatic patients**
  - Provide tissues and no-touch receptacles (i.e. waste container with foot-operated lid or uncovered waste container) for used tissue disposal
  - Provide conveniently located dispensers of alcohol-based hand rub
  - Provide soap and disposable towels for hand washing where sinks are available

Contain Respiratory Spread

- Ensure early recognition and transmission prevention at the initial encounter with healthcare facility
- Post **visual alerts** (in local languages) at the entrance to outpatient facilities (registration, emergency departments, outpatient clinics etc)
- Instructing patient and accompanying persons to
  - Inform healthcare personnel of respiratory symptoms when they register for care
  - Practice respiratory hygiene (cough etiquette)
  - Wear a surgical mask if symptomatic
  - Directed to the separate waiting area for symptomatic respiratory patients
- During periods of increased respiratory infection in the community, offer triple-layer masks to persons who are coughing
- Encourage coughing persons to sit at least 1 metre away from others in common waiting areas

PPE for use in health care for COVID-19

Face Mask

Nose + mouth

N95 Mask

Nose + mouth

Face shield

Eyes + Face

Goggle

Eyes

Gown

Body

Apron

Body

Gloves

Hands

Head cover

Head + hair

Shoe cover

Feet

Source: WHO2015 Liberia Safe & Quality Health Services Package

Risk Assessment and Standard Precautions

- **Risk assessment:** risk of exposure and extent of contact anticipated with blood, body fluids, respiratory droplets, and/or open skin
    - Select which PPE items to wear based on this assessment
    - Perform hand hygiene according to the WHO “5 Moments”
    - Should be done for each patient, each time

Make this as routine!

Minimize Direct Unprotected Exposure

Scenario	Hand hygiene	Gloves	Gown	Medical mask	Eye-wear
Always before and after patient contact, and after contaminated environment	✔				
If direct contact with blood and body fluids, secretions, excretions, mucous membranes, non-intact skin	✔	✔			
If there is risk of splashes onto the health care worker's body	✔	✔	✔		
If there is a risk of splashes onto the body and face	✔	✔	✔	✔	✔

Principles of PPE Use (1)

- **Always perform hand hygiene before and after wearing PPE**
- PPE should be available where and when indicated
  - **according to risk**
  - in the correct size
- Always put PPE on before contact with the patient
- Remove PPE immediately after completing the task and/or leaving the patient care area
- Never reuse disposable PPE
- **Clean and disinfect reusable PPE between each use**

Principles of PPE Use (2)

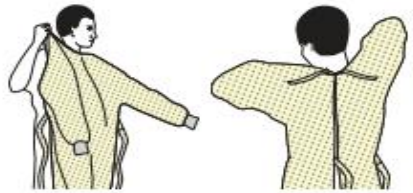
- **Change PPE immediately if it becomes soiled/ contaminated or damaged**
- PPE **should not be adjusted or touched during patient care**
- Never touch your face while wearing PPE
- if there is concern and/or breach of these practices
  - leave the patient care area when safe to do so
  - properly remove and change the PPE
- Always remove PPEs remove carefully to avoid self-contamination
  - From dirtiest to cleanest areas

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

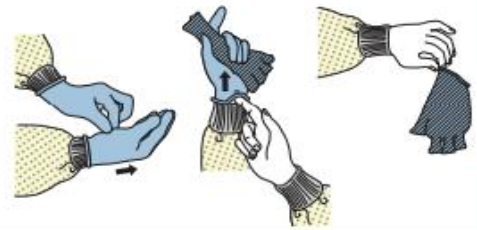
- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene

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

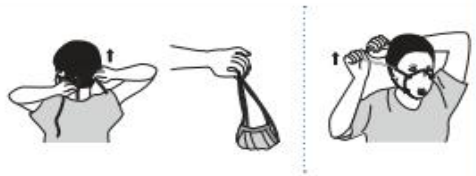
- Outside of goggles or face shield are contaminated!
- If your hands get contaminated during goggle or face shield removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Remove goggles or face shield from the back by lifting head band or ear pieces
- If the item is reusable, place 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

Seven steps to safe injections

1 Clean work space

2 Hand hygiene

3 Sterile safety-engineered syringe

4 Sterile vial of medication and diluent

5 Skin cleaning and antisepsis

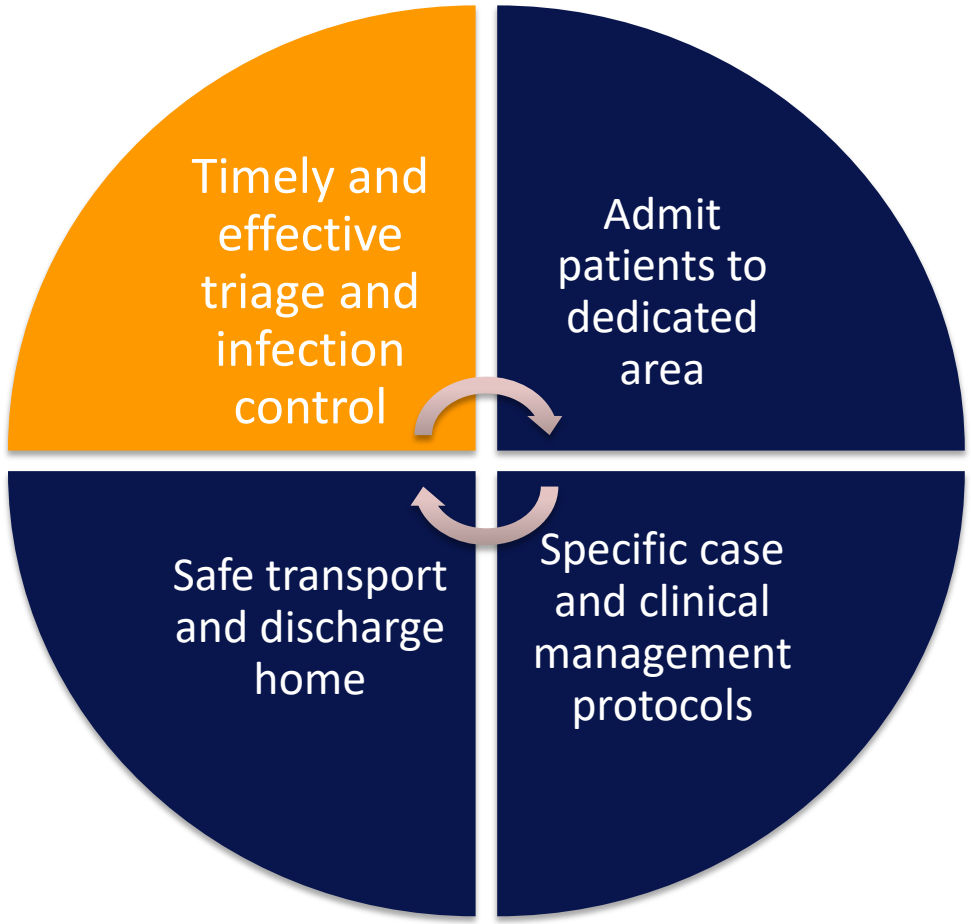
6 Appropriate collection of sharps

7 Appropriate waste management

https://www.who.int/infection-prevention/tools/injections/training-education/en/

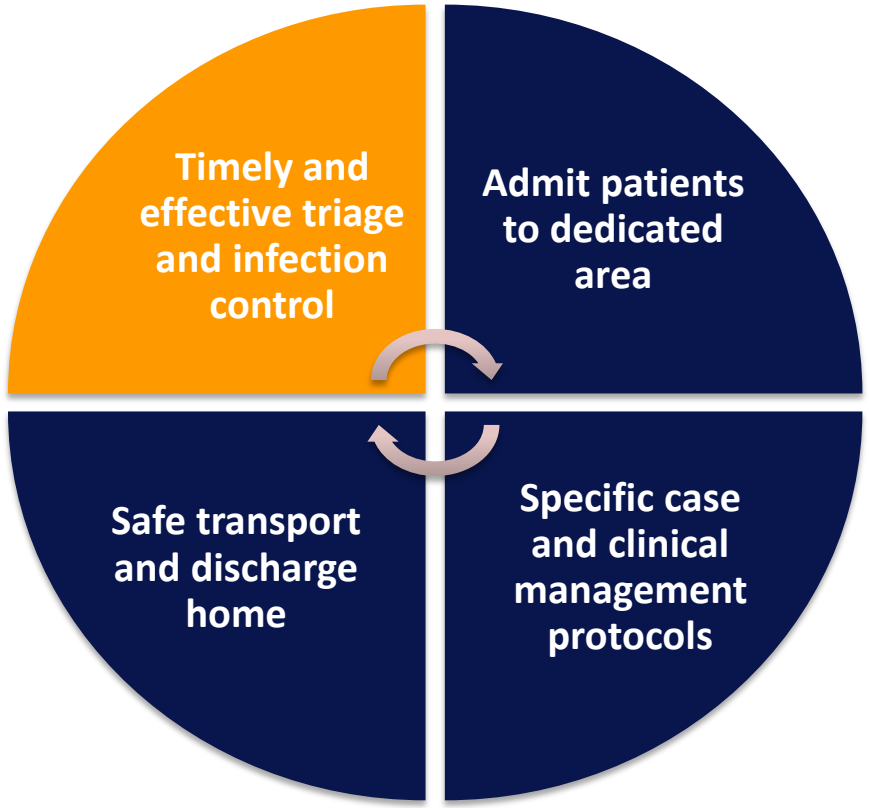
Triage, Early Identification, and source Control

Managing ill Patients Seeking Care



Use clinical triage in all health care facilities for early identification of patients with acute respiratory infection (ARI) to prevent transmission of pathogens to health care workers and others

Triage



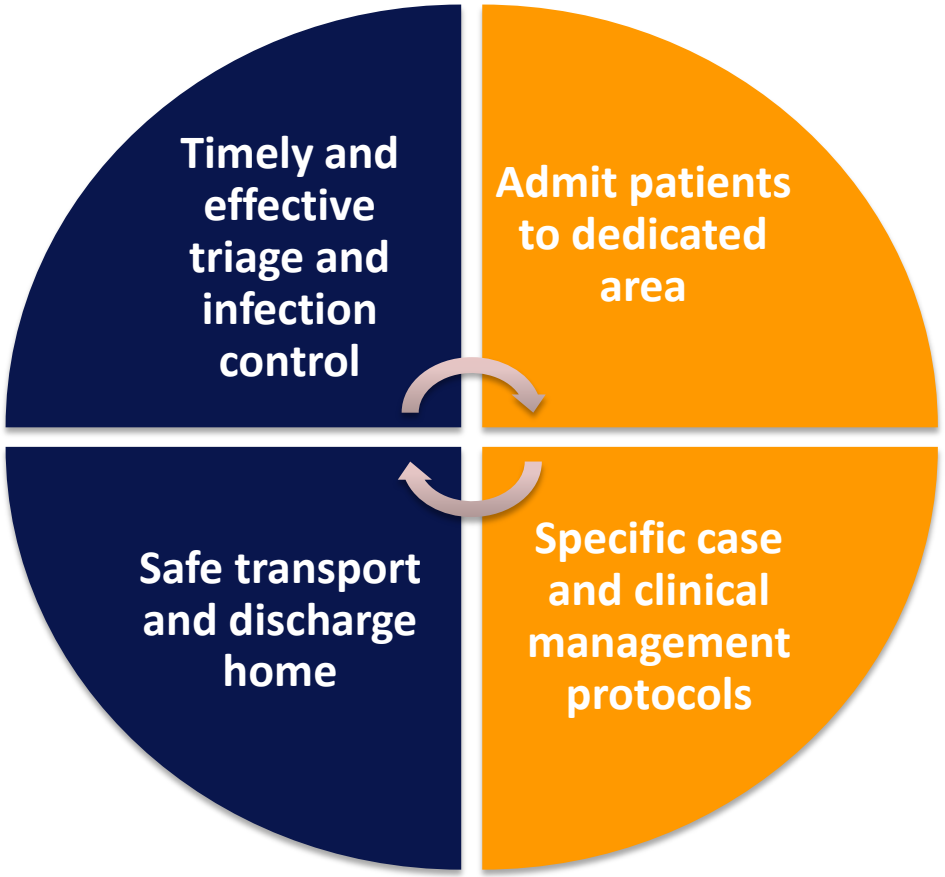
- **Prevent overcrowding**
- Conduct rapid triage
- Family members should wait outside the triage area
- Place ARI patients in **dedicated waiting areas** with adequate ventilation
- Ask patients with **respiratory symptoms to wear face mask,** follow **respiratory** and **hand hygiene**
- Ensure **at least 1 m distance** between patients
- Maintain a **one way flow** of patients and staff
- In addition to standard precautions, implement
  - Droplet precautions
  - Contact precautions (if close contact with the patient or contaminated equipment or surfaces/materials)

Equipment in Triage Area

The triage or screening area should have

- Clear directions to triage area
- Algorithm for triage
- Screening questionnaire
- Documentation papers
- PPE
- Hand hygiene equipment
- IEC materials and IPC posters
- Infrared thermometer
- Waste bins and access to cleaning/disinfection
- Signage in local language for patients with specific symptoms to alert HCWs

Hospital admission and Patient Placement



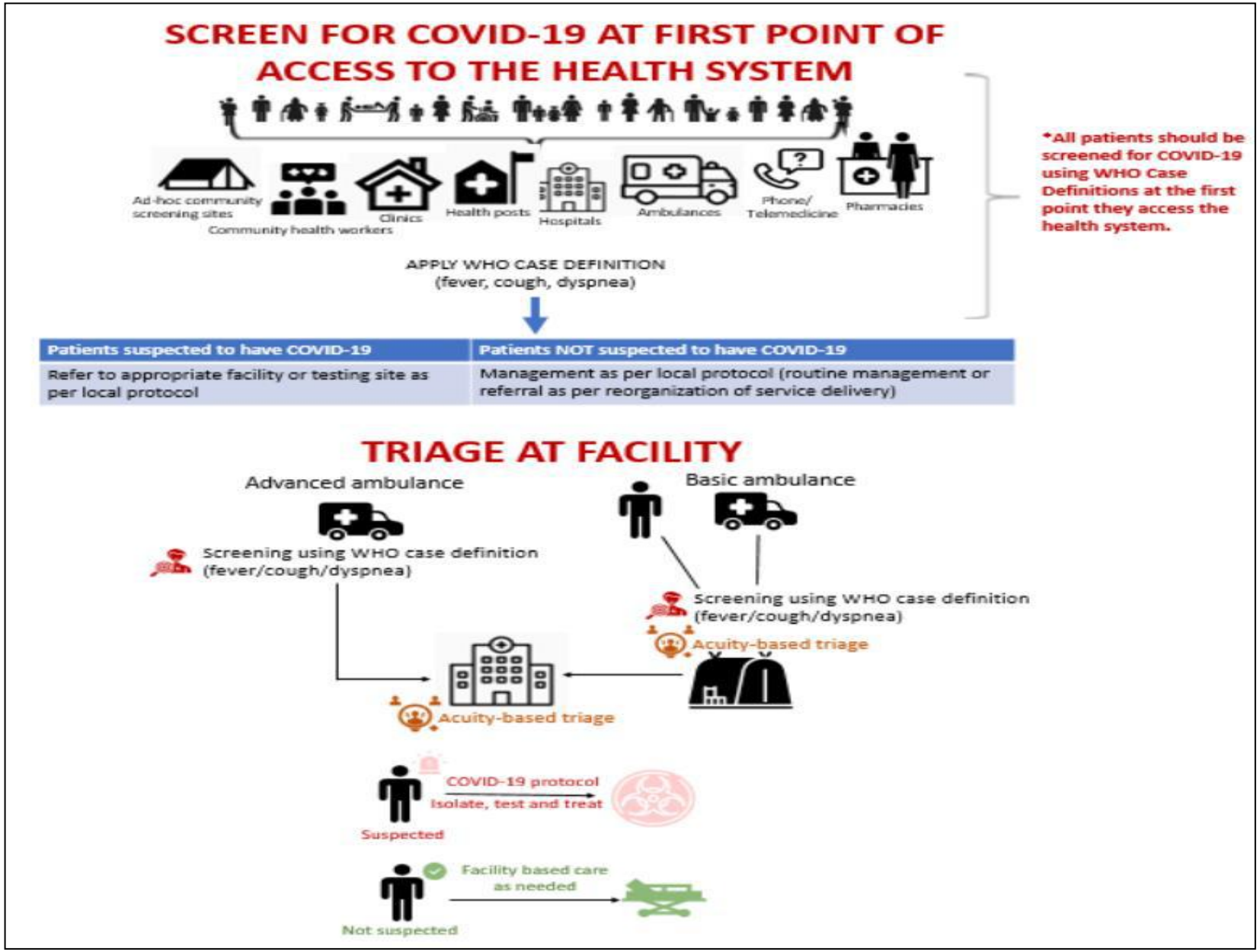
- Place patients with COVID-19 infection in single well ventilated room when possible
- If single isolation rooms not possible
  - Keep patients in well ventilated wards
  - Cohort patients with the same diagnosis in one area/ward
  - **Do not place suspect/ confirmed COVID-19 patients in same area/ward as those who are confirmed**
- Assign trained and experienced healthcare workers.

Referral Pathways

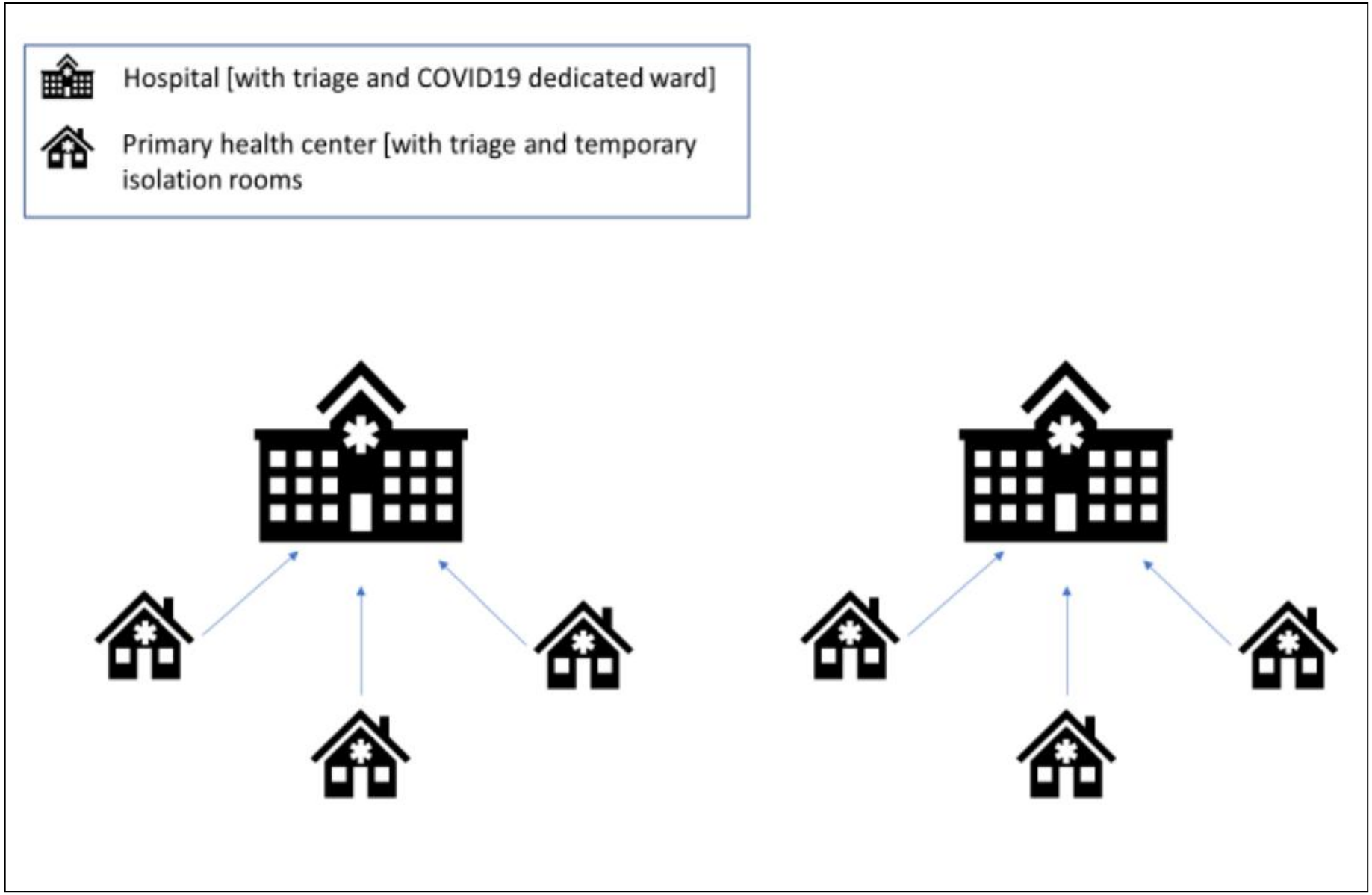
- **Screening and triage**
  - Screening: Area where an individual is evaluated and screened using the case definition; if the person becomes a suspected case, refer to COVID-19 protocol.
  - Isolation: If the case definition is met, the patient should immediately be given a mask and directed to a separate area (an isolation room if available). At least 1 m distance should be kept between suspected patients and other patients.
  - Triage: Acuity-based triage is the standard method used for identifying patients
    - who require immediate medical intervention,
    - patients who can safely wait, or
    - patients who may need to be transported to a specific facility based upon their condition.
- **Hub and spoke model** (community transmission)
  - During community transmission, there will be need for multiple COVID-19 treatment areas; a hub and spoke model of referral is recommended.

file:///C:/Users/HP/Downloads/WHO-2019-nCoV-HCF_operations-2020.1-eng.pdf

Screening and triage



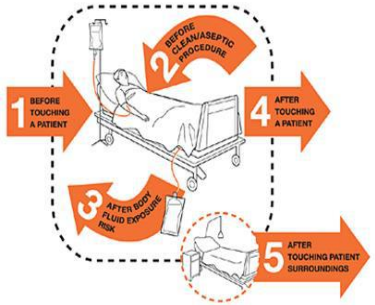
Hub and spoke model



Additional Precautions

Patients suspected or confirmed COVID-19 (1)

- **Contact** and **droplet precautions** for all suspected and confirmed COVID-19 patients
- Airborne precautions recommended **only for aerosol generating procedures** (i.e. open suctioning of respiratory tract, intubation, bronchoscopy, cardiopulmonary resuscitation)
- Preferably patient should be in a single room
    - **Natural ventilation** with **air flow of at least 160 L/s per patient** (or)
    - **Negative pressure rooms** with **at least 12 air changes (ACH) per hour**
    - Controlled direction of air flow when using mechanical ventilation
- **<u>Cohort:</u>** All patients with respiratory illness should be in a single room or **minimum 1m away from other patients** when waiting for a room
- Dedicated & trained HCW to provide care
- **HCW to wear PPE**: a medical mask, goggles or face shield, gown, and gloves
- **Hand hygiene** should be done **any time the WHO "5 Moments" apply**, and **before** PPE and **after** removing PPE



Patients suspected or confirmed COVID-19 (2)

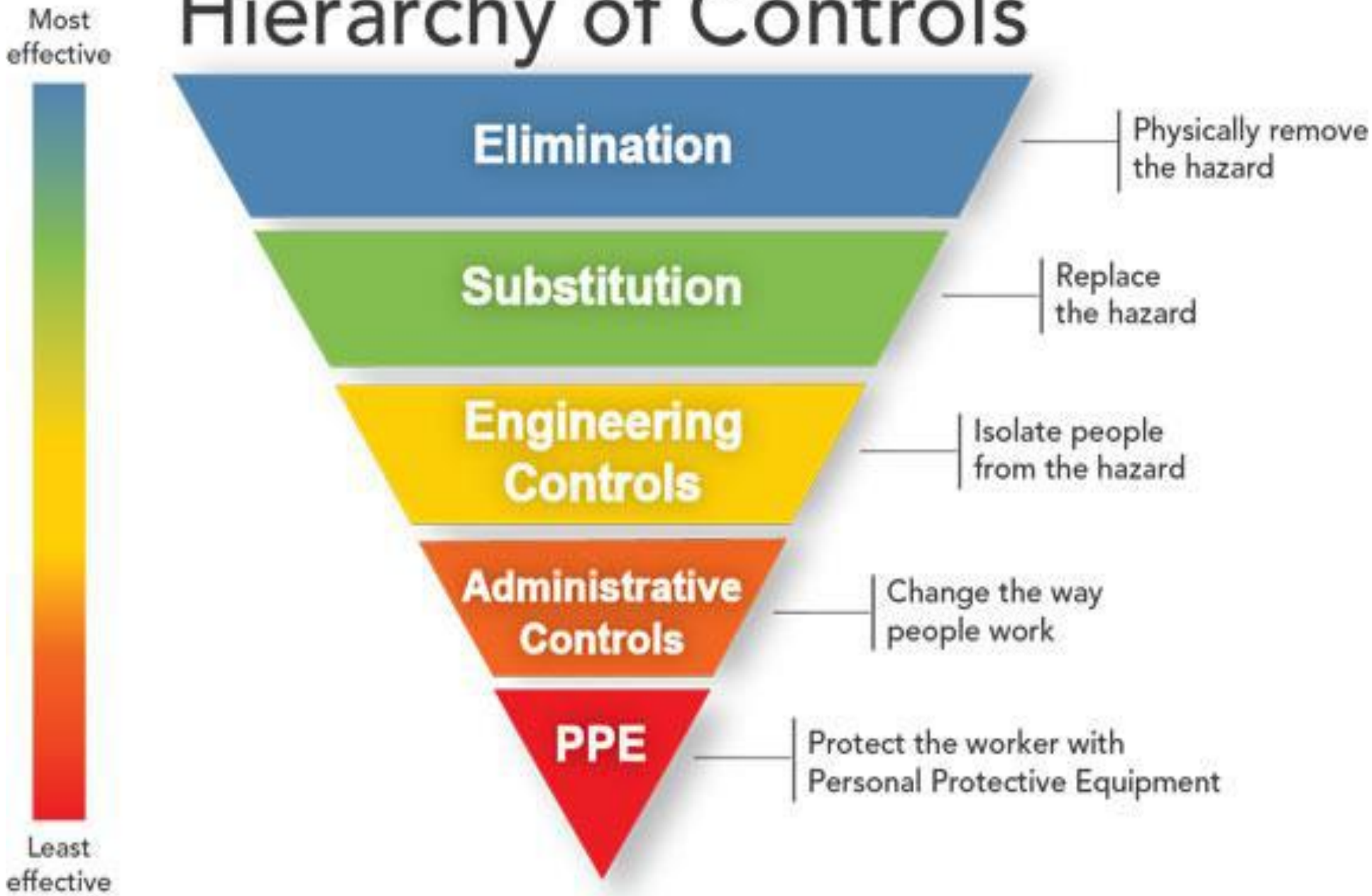
- Equipment should be single use when possible, dedicated to each patient and disinfected between uses
- Avoid transporting suspected or confirmed cases, if necessary
  - have patients wear masks.
  - HCW assisting should wear appropriate PPE
- Routine cleaning of the environment is crucial
- Limit number of HCW, visitors and family members who are in contact with the patient.
- All persons entering the patients room (including visitors) should be recorded (for contact tracing purposes)
- Everyone must wear PPE based on risk
- Precautions should continue until the patient is discharged

Outpatient Care

- The basic principles **of IPC and standard precautions** should be applied in **all health care facilities** including **outpatient care** and **primary care**
  - Triage and early recognition
  - Emphasis on respiratory and hand hygiene.
  - Medical masks to be used by patients with respiratory symptoms (consider having signage)
  - Place **patients in separate rooms or away from other patients** in the waiting rooms
  - When symptomatic patients are required to wait, ensure they have a separate waiting area (1m separation)
  - Wear mask, gloves and gown (if possible) while examining patients in the clinic (as much of contact and droplet precautions as possible)
  - Prioritization of care of symptomatic patients;
  - Educate patients and families about early recognition of symptoms, basic precautions to be used and which healthcare facility they should refer to

Additional Control Measures

Hierarchy of Controls



Source: https://www.cdc.gov/niosh/topics/hierarchy/default.html

Administrative Controls

- Provision of adequate training for healthcare workers
- Ensuring adequate patient-to-staff ratio
- Establishing a surveillance process for acute respiratory infections potentially caused by COVID-19 among HCWs
- Ensuring that HCWs and the public understand the importance of promptly seeking medical care
- Monitoring healthcare workers compliance with standard precautions and providing mechanisms for improvement as needed.

Home care for patients with suspected COVID-19 infection with mild symptoms

- Place patients in a well-ventilated single room (with windows and door open)
- Limit the movement of the patient & minimize shared space
- Household members should stay in a different room or, if that is not possible, maintain a distance of at least 1 m from the ill person
- Limit the number of caregivers - good health and has no underlying disease
- Visitors should not be allowed.
- Perform hand hygiene after contact with patients or their immediate environment, before and after preparing food, before eating, after using the toilet and whenever hands look dirty
- To contain respiratory secretions, provide medical mask to the patient

Home care for patients with suspected COVID-19 infection with mild symptoms (2)

- Individuals who cannot tolerate a medical mask should use rigorous respiratory hygiene
- Caregivers should wear a tightly fitted medical mask that covers their mouth and nose while in the patient's room
- Avoid direct contact with body fluids.Use disposable gloves and a mask when providing oral or respiratory care and when handling stool, urine and other waste. Perform hand hygiene before and after removing gloves and the mask
- Use dedicated linen and eating utensils for the patient; these items should be cleaned with soap and water after use and may be re-used instead of being discarded
- Clean and disinfect daily surfaces that are frequently touched in the room where the patient is being cared for (Household soap or detergent should be used first for cleaning, and then, after rinsing, regular household disinfectant with 0.1% sodium hypochlorite)
- Clean the patient's clothes, bed linen, and bath and hand towels using regular laundry soap and water or machine wash at 60–90 °C with common household detergent, and dry thoroughly

Use of Face mask

- Use of face mask- limit spread of certain respiratory diseases
- Mask alone is insufficient to provide the adequate level of protection and other equally relevant measures should be adopted – Hand hygiene
- Wearing medical masks when not indicated may cause
  - Unnecessary cost
  - Procurement burden
  - Create false sense of security that can lead to neglecting other essential measures such as hand hygiene practices
- Using a mask incorrectly may hamper its effectiveness to reduce the risk of transmission

https://apps.who.int/iris/bitstream/handle/10665/330987/WHO-nCov-IPC_Masks-2020.1-eng.pdf?sequence=1&isAllowed=y

Use of Face mask : Community Setting

- Individuals without respiratory symptoms
  - Avoid closed crowded spaces
  - Maintain distance – 1 meter
  - Practice hand and respiratory hygiene
  - Refrain from touching face, nose, mouth
  - No need of mask ??
    - Vulnerable individuals ideally must avoid crowded areas and use surgical face masks rationally when exposed to high risk areas
    - Infection may be transmitted before symptom onset, community transmission can be reduced if people in quarantine/everyone wear masks including people infected but are asymptomatic and contagious)

    (https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(20)30134-X/fulltext)
- Individuals with respiratory symptoms
  - Wear a surgical mask
  - Seek medical care
  - Learn mask management

Use of Mask : Home based care

- Individuals with suspected infection with mild respiratory symptoms
- Relatives or caregivers

Along with

- Hand hygiene
- Keeping distance from affected individual as much as possible (at-least 1 meter)
- Improve airflow in living space by opening windows as much as possible
- Appropriate mask management and disposal

Use of Mask : Health Care Settings

Individuals with respiratory symptoms should:

- Wear a medical mask while waiting in triage or waiting areas or during transportation within the facility
- Not wear a medical mask when isolated in single rooms but cover mouth and nose when coughing or sneezing with disposable paper tissues

Health care workers should:

- wear a medical mask while providing care to the patient
- Use a particulate respirator N95 (NIOSH certified) or FFP 2/3 or equivalent, when performing aerosol generating procedures (tracheal intubation, non-invasive ventilation, tracheotomy, cardiopulmonary resuscitation, manual ventilation before intubation, and bronchoscopy).

Mask Management

- Place mask carefully to cover mouth and nose and tie securely to minimize any gaps between the face and the mask
- While in use, avoid touching the mask and remove the mask by using appropriate technique (i.e. do not touch the front but remove the lace from behind)
- After removal or whenever you inadvertently touch a used mask, clean hands by using an alcohol-based hand rub or soap and water
- Replace masks with a new clean, dry mask as soon as they become damp/humid
- Do not re-use single-use face masks
- Discard single-use masks after each use and dispose them of immediately upon removal

Environmental Cleaning and Disinfection

Environmental Decontamination (1)

General Principles

- Healthcare environment contains a diverse population of microorganisms but only few are significant pathogens
- Microbiologically contaminated surfaces can serve as reservoirs of potential pathogens
- **Transfer of microorganisms** from contaminated surfaces to patients/staff is mostly via **hand contact with the surface**
- Hand hygiene is important to minimize the impact of this transfer
- Cleaning and disinfecting environmental surfaces is fundamental in reducing healthcare-associated infections

Environmental Decontamination (2)

- COVID-19 virus can potentially survive in the environment for several hours/days
- Premises and areas potentially contaminated with the virus to be cleaned before their re-use
- Products containing antimicrobial agents known to be effective against coronaviruses may be used
- Established cleaning strategies to be used
  - Remove the majority of bioburden
  - Disinfect equipment and environmental surfaces

Environmental Decontamination (3)

- **Housekeeping surfaces can be divided into two groups**
  - Those with minimal hand contact (e.g. floors and ceilings)
  - “High touch surfaces” – those with frequent hand-contact
- **High touch housekeeping surfaces in patient-care areas should be cleaned and disinfected more frequently**
  - Doorknobs
  - Bedrails
  - Light switches
  - Wall areas around the toilet in the patient’s room
  - Edges of privacy curtains

Cleaning and Disinfection of Medical Equipment (1)

- Wear gloves when handling and transporting used patient care equipment
- Before removing equipment from patients room, medical equipment must be disinfected
- Non-critical medical equipment:
  - Usually only require cleansing followed by low- to intermediate-level disinfection, depending on the nature and degree of contamination
  - E.g., stethoscopes, blood pressure cuffs, equipment knobs and controls

Cleaning and Disinfection of Medical Equipment (2)

- In absence of manufacturer's instructions regarding cleaning/disinfection of equipment
  - Use ethyl alcohol or isopropyl alcohol (60%–90%, v/v) to disinfect small surfaces (rubber stoppers of multiple-dose medication vials, and thermometers) and occasionally external surfaces of equipment (stethoscopes and ventilators)
- Alcohol causes discoloration, swelling, hardening and cracking of rubber and certain plastics after prolonged and repeated use

Cleaning and Disinfection of Medical Equipment (3)

Difficult to clean surfaces and equipment:

- Barrier protection of such surfaces and equipment is useful especially if these surfaces are
  - Touched frequently by gloved hands during the delivery of patient care
  - Likely to become contaminated with body substances
- Impervious material backed paper, plastic or fluid-resistant covers are suitable for use as barrier protection (cover mattresses for easier disinfection)
- Remove and discard/disinfect coverings with gloved hands
- Perform hand hygiene after ungloving
- Cover these surfaces with clean materials before the next patient encounter

Cleaning and Disinfection of Medical Equipment (4)

Area/Items	Inputs	Process	Method/ procedure
Stethoscope	Alcohol-based rub/Spirit swab	Cleaning	○ Should be cleaned with detergent and water ○ Should be wiped with alcohol based rub/spirit swab before each patient contact
BP cuffs & covers	Detergent Hot water	Washing	○ Cuffs should be wiped with alcohol- based disinfectant and regular laundering is recommended for the cover
Thermometer	Detergent and water Alcohol rub Individual thermometer holder	Cleaning	○ Should be stored dry in individual holder ○ Clean with detergent and tepid water and wipe with alcohol rub in between patient use ○ Store in individual holder inverted ○ Preferably one thermometer for each patient
Injection and dressing trolley	Detergent and water Duster Disinfectant (70% alcohol)	Cleaning	○ To be cleaned daily with detergent and water ○ After each use should be wiped with disinfectant

Cleaning soiled bedding, towels and clothes from patients with COVID-19 (1)

Clean laundry and surfaces in all environments where COVID-19 cases receive care at least once a day and when a patient is discharged

- **Hospital disinfectants:**
  - 70% ethyl alcohol for small areas – reusable dedicated equipment (e.g., thermometers)
  - Sodium hypochlorite at 0.5% (equivalent 5000 ppm) for surface disinfection
- **Staff dealing with soiled bedding, towels and clothes from COVID-19 patients should**
  - Wear appropriate PPE – heavy duty gloves, mask, eye protection (goggles/face shield), long-sleeved gown, apron (if gown is not fluid resistant), and boots or closed shoes
  - Never carry soiled linen against body; place soiled linen in a leak-proof bag or bucket
  - Perform hand hygiene after blood/body fluid exposure and after PPE removal

Cleaning soiled bedding, towels and clothes from patients with COVID-19 (2)

Soiled linen should be placed in clearly labelled, leak-proof bags or containers, carefully removing any solid excrement and putting in covered bucket to dispose of in the toilet

- **Washing machine**
  - Wash at 60-90°C with laundry detergent followed by soaking in 0.1% chlorine for approximately 30 minutes and dried
- **Non machine washing**
  - Soaked in hot water with soap/detergent in a large drum
  - Use a stick to stir and avoid splashing
  - Empty the drum and soak linen in 0.1% chlorine for approx. 30 minutes
  - Rinse with clean water and let linens dry fully in the sunlight

Cleaning and Disinfection of Occupied Patient Rooms

- Designate specific well-trained staff for cleaning environmental surfaces
- Cleaning personnel should wear PPE and must be trained on proper use of PPE and hand hygiene
- Define the scope of cleaning to be done each day
- Use a checklist to promote accountability for cleaning responsibilities
- Keep cleaning supplies outside the patient room

Cleaning of Housekeeping Surfaces and Eating Utensils

- **Housekeeping surfaces**
  - Require regular cleaning and removal of soil and dust
  - Personal protective equipment (PPE) used during cleaning and housekeeping procedures
  - Need to be cleaned only with soap and water or a detergent/disinfectant, depending on the nature of the surface and the degree of contamination
- **Dishes and eating utensils used by a patient with known or suspected infection**
  - No special precautions other than standard precautions
  - Wear gloves when handling patient trays, dishes and utensils

Spill Management

- Worker assigned to clean the spill should wear gloves and other personal protective equipment
- Most of the organic matter of the spill to be removed with absorbent material
- Surface to be cleaned to remove residual organic matter
- Use disinfectant: hypochlorite
  - 1% for small spills
  - 10% for large spills

Cleaning and Disinfection after Patient Discharge/Transfer

- Clean and disinfect all surfaces that were in contact with patient or may have become contaminated during patient care
- Do not spray or fog occupied or unoccupied rooms with disinfectant – potentially dangerous practice that has no proven benefits

Biomedical Waste Management

Bio-Medical Waste Management Rules 2016, amended 2018 & 2019

- Environment Protection Act, 1986
- Apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle any bio-medical waste
- "**Occupier**" means a person having administrative control over the institution and the premises generating bio-medical waste
- Responsibility of every occupier – safe and proper identification, handling, storage and disposal of biomedical waste from laboratories and related facilities

Segregation, Packaging, Transportation and Storage

- Untreated bio-medical waste should not be mixed with other wastes
- Bio-medical waste shall be segregated into containers or bags at point of generation (as per BMWM Rules 2016, amendment 2018 & 2019)
- Bio-medical waste containers or bags should be prominently labelled with biohazard symbol (and other details as per Rules)
- Untreated bio-medical waste must not be stored >48 hrs
- Ensure no spillage occurs during handling and transit of bio-medical waste

Yellow bag

- Anatomical waste – human, animal body parts & tissue
- Soiled waste – items contaminated with blood or body fluids – like dressings, cotton swabs and bags containing residual blood/blood components
- Chemical waste – chemicals used in production of biologicals
- Microbiology, biotechnology and other clinical laboratory waste (to be pre-treated by autoclaving before discarding):
  - Blood bags
  - Laboratory cultures
  - Stocks or specimens of microorganisms
  - Live or attenuated vaccines
  - Human and animal cell cultures
- Discarded linen contaminated with blood or body fluid including mask and gown

Red Bag

- Contaminated recyclable waste
- Waste from disposable items:
  - Tubing and bottles
  - Intravenous tubes and sets
  - Catheters and urine bags
  - Syringes (without needles), vacutainers
  - Gloves
- Plastic petri-plates containing infectious material to be pre-treated by autoclaving and discarded in red bags

Translucent white box

- Puncture, leak and tamper proof
- Sharps waste (used, discarded and contaminated metal sharps)
  - Needles
  - Syringes with fixed needles
  - Needles from needle tip cutter or burner
  - Scalpels
  - Blades
- Any other contaminated sharps

Blue box

- Or containers with blue coloured marking
- Puncture and leak proof boxes
- **Glassware**
  - Broken or discarded glass including medicine vials & ampoules (except those contaminated with cytotoxic waste)
  - Broken or discarded contaminated glass

Labelling of BMW bags

Label should be non-washable and prominently visible

Waste category Number …….. Waste quantity…….. Sender's Name and Address: Phone Number …….. Fax Number …….. Contact Person …….. In case of emergency please contact : Name and Address : Phone No.	Day …….. Month …….. Year …….. Date of generation …….. Receiver's Name and Address: Phone Number:…….. Fax Number…….. Contact Person ……..

Disposal of BMW

Category	Type of bag/container	Type of waste	Treatment disposal options
Yellow	Non chlorinated colour coded bags in coloured bins Separate collection system leading to ETP	• Human anatomical waste • Animal anatomical waste • Soiled waste • Expired or discarded medicines • Chemical waste • Micro, biotech & clinical lab waste • Chemical liquid waste	Incineration/deep burial
Red	Non chlorinated plastic bags in coloured bins/ containers	Contaminated waste (recyclable) tubing, bottles, urine bags, syringes (without needles) and gloves	Auto/micro/hydro and then sent to recycling
White	Translucent, puncture, leak & tamper proof	Waste sharps including metals	Auto/dry heat sterilization followed by shredding /mutilation/encapsulation
Blue	Water proof card board boxes/containers	Glassware waste	Disinfection or auto/micro /hydro then sent to recycling

*Disposal by deep burial is permitted only in rural or remote areas where there is no access to common bio-medical waste treatment facility. This will be carried out with prior approval from the prescribed authority

COVID-19 Isolation Wards (1)

- Use dedicated trolleys and separate colour coded bins/bags/containers in COVID-19 isolation wards and maintain proper segregation of waste as per BMWM Rules, 2016 as amended and CPCB guidelines for implementation of BMW Management Rules. A label “COVID-19 Waste” to be pasted on these items
- As precaution double layered bags (using 2 bags) should be used for collection of waste from COVID-19 isolation wards so as to ensure adequate strength and no-leaks
- Collect and store biomedical waste separately prior to handing over the same CBWTF. Use a dedicated collection bin labelled as “COVID-19” to store COVID-19 waste bags and keep separately in temporary storage room prior to handing over to authorized staff of CBWTF. Biomedical waste collected in such isolation wards can also be lifted directly from ward into CBWTF collection van

COVID-19 Isolation Wards (2)

- In addition to mandatory labelling, bags/containers with biomedical waste from COVID-19 wards, should be labelled as “COVID-19 Waste”, to enable CBWTFs to identify the waste easily for priority treatment and disposal immediately upon the receipt
- Maintain separate record of waste generated from COVID-19 isolation wards
- General waste not having contamination should be disposed as solid waste as per SWM Rules, 2016

Conclusions

- IPC is key for quality patient care and containment
- Based on key principles- Hand Hygiene, Respiratory etiquette, contact and droplet precautions
- Hospital Infection Prevention & control- Standard & Additional precautions
  - Protect Yourself and the community
  - Triage for OPD and inpatients
  - PPE
    - Judicious and appropriate use
    - Pay attention to donning and doffing
- Home care precautions

Conclusion (2)

- Cleaning and disinfecting environmental surfaces is fundamental in reducing healthcare-associated infections
- Established cleaning strategies to be used
- Cleaning staff must be protected by use of standard precautions including use of appropriate PPE
- Manage biomedical waste as per existing Biomedical waste management Rules and specific guidelines for COVID-19

Resources

- https://www.mohfw.gov.in/pdf/NationalGuidelinesforIPCinHCF-final.pdf
- WHO Coronavirus Homepage
- https://www.who.int/emergencies/diseases/novel-coronavirus-2019
- All coronavirus (COVID-19) technical guidance documents
- https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance
- IPC documents
- https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/infection-prevention-and-control
- https://www.who.int/infection-prevention/publications/en/
- Questions and Answers
- https://www.who.int/news-room/q-a-detail/q-a-coronaviruses

Ministry of Health & Family Welfare
Government of India

World Health Organization
India

Thank you

Wash your hands

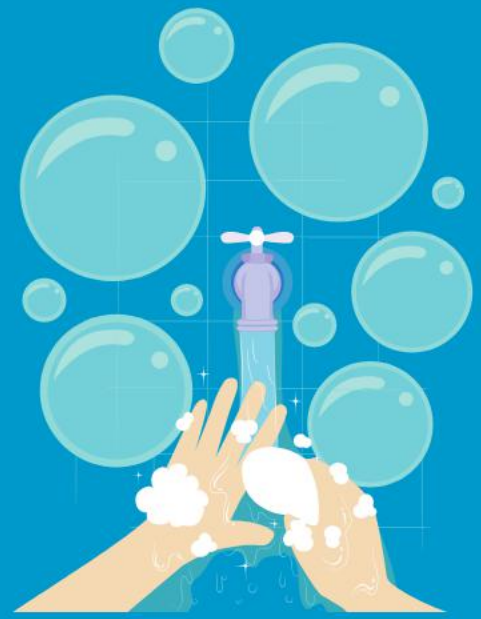
Wash your hands with soap and running water when hands are visibly dirty

If your hands are not visibly dirty, frequently clean them by using alcohol-based hand rub or soap and water

World Health Organization

Protect yourself and others from getting sick

Wash your hands



- after coughing or sneezing
- when caring for the sick
- before, during and after you prepare food
- before eating
- after toilet use
- when hands are visibly dirty
- after handling animals or animal waste

World Health Organization

Protect others from getting sick

When coughing and sneezing **cover mouth and nose** with flexed elbow or tissue

Throw tissue into closed bin immediately after use

Clean hands with alcohol-based hand rub or soap and water after coughing or sneezing and when caring for the sick

World Health Organization

Protect others from getting sick

Avoid close contact when you are experiencing cough and fever

Avoid spitting in public

If you have fever, cough and difficulty breathing seek medical care early and share previous travel history with your health care provider

World Health Organization

Ministry of Health & Family Welfare
Government of India

Reduce the risk of Coronavirus infection
Follow these important precautions

Avoid travel if you are suffering from fever and cough

Wash your hands frequently with soap and water

Share your travel history with your health worker (ASHA/ ANM)

If you have cough, fever or difficulty in breathing, contact a doctor immediately

Stay protected! **Stay safe from Coronavirus!**

If you have returned from **Wuhan** China after January 15, then get yourself tested for 2019-nCov. To know about the centres for testing, call the Ministry of Health and Family Welfare Helpline

If you have returned from China in the last 15 days or have been in contact with any person affected by Coronavirus, then limit your contact with others and use a separate room for sleeping

If you develop fever, cough and difficulty in breathing within 28 days of return from China, immediately call the Ministry of Health and Family Welfare Helpline

24X7 **+91-11-23978046**

www.mohfw.nic.in
www.mygov.in
www.pmindia.gov.in

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@MoHFW_INDIA

http://ncdc.gov.in/
@director_NCDC

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Reduce the risk of Coronavirus infection
Follow these important precautions

Coronavirus is a new disease which is happening in China and has affected other countries. The virus has flu like symptoms such as:

1.  Fever
2.  Cough
3.  Difficulty in breathing

If you have returned from Wuhan, China after January 15, then get yourself tested for 2019-nCov. To know about the centres for testing, call the Ministry of Health and Family Welfare Helpline +91-11-23978046

If you have returned from China in the last 15 days or have been in contact with any person affected by Coronavirus, then limit your contact with others and follow these important steps:

1.  Limit contact with everybody for the next 14 days and sleep in a separate room
2.  Cover your nose and mouth while sneezing
3.  Wash your hands with soap regularly
4.  Stay far away from persons who have cough, cold and fever

If you have cough, fever or difficulty in breathing, contact a doctor immediately

If you develop fever, cough and difficulty in breathing within 28 days of return from China, immediately call the Ministry of Health and Family Welfare Helpline

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Stay protected! **Stay safe from Coronavirus!**

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Reduce the risk of Coronavirus infection
Follow these important precautions

Remember to wash hands with soap frequently

After coughing and sneezing

After using toilet

Clean your hands before and after caring for sick person

Before cooking, after cooking and before eating food

If you have cough, fever or difficulty in breathing, contact a doctor immediately

Stay protected! **Stay safe from Coronavirus!**

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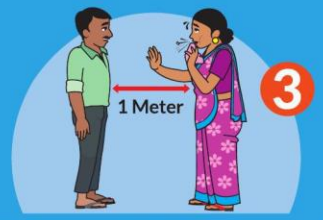
Reduce the risk of Coronavirus infection
Follow these important precautions

Wash hands with soap and water frequently

When coughing and sneezing, cover mouth and nose with handkerchief, tissue or elbow



Avoid close contact with anyone with cold, cough or flu like symptoms

If you have cough, fever or difficulty in breathing, contact a doctor immediately

Stay protected! **Stay safe from Coronavirus!**

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