

Infection Control and Hospital Readiness- Novel Coronavirus

NPO- International Health Regulations

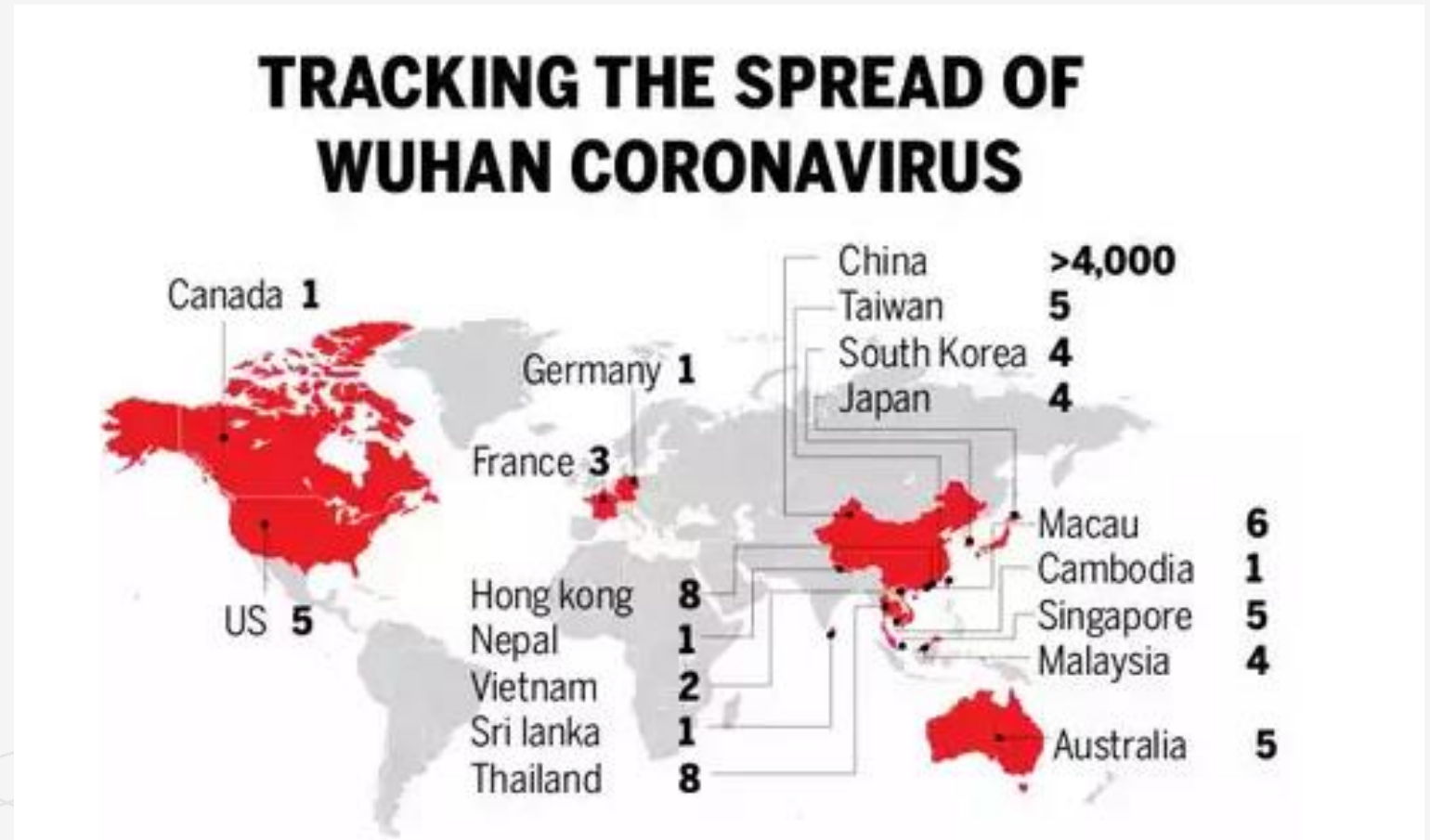
Team- Health Security and Emergencies

WHO Country Office for India

29 Jan 2020

We are still learning about this virus, but hospitals need to be ready

? Incubation Period
? Period of Infectivity



Clinical care of suspected patients with 2019-nCoV should focus on

- Early recognition
- Immediate isolation (separation)
- Implementation of appropriate infection prevention and control (IPC) measures and
- Provision of optimized supportive care.

Aims of Hospital Readiness

- Prevent spread of 2019-nCoV
- Identify and isolate patients with 2019-nCoV and inform key facility staff and public health authorities
- Care for a limited number of patients with known or suspected 2019-nCoV- identified through entry screening
- Potentially care for a larger number of patients in the context of escalating transmission
- Outline plans for internal and external communication
- Monitor and manage healthcare personnel with potential for exposure to 2019 nCoV
- Manage the impact on patients, the facility, and healthcare personnel

Reference Document – for this presentation

Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected

WHO 2020 (25 January)

Interim Guidance from WHO is based on current knowledge of the situation in China and other countries where cases were identified and experiences with severe acute respiratory syndrome (SARS)-CoV and MERS-CoV.

WHO will update these recommendations as new information becomes available.

Advice on IPC for 2019-nCoV : Generic Guidance

Promotion of a safety climate is a cornerstone of prevention of transmission of pathogens in health care.

Standard precautions should be the minimum level of precautions used when providing care for all patients.

Risk assessment is critical.

Assess all health-care activities to determine the personal protection that is indicated.

Implement source control measures for all persons with respiratory symptoms through promotion of respiratory hygiene and cough etiquette.

Exact Modes of Transmission of 2019-nCoV – not known

Exact mode of transmission is unknown, but available evidence support the following mode of transmission

Indoor transmission:

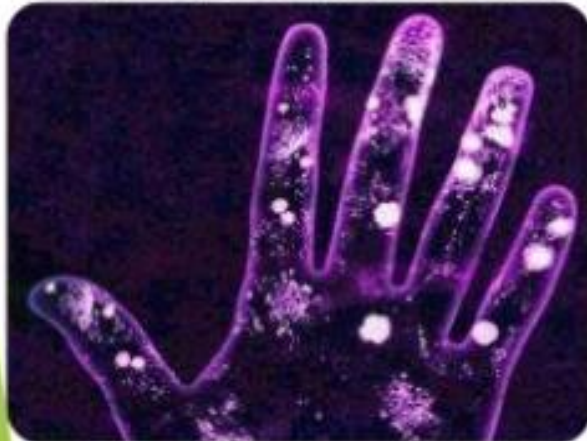
Droplets, Direct and indirect contact, and possibly the following: Fomite transmission, Airborne transmission.

Outdoor transmission:

Droplets, and direct contact



Aerosolized droplets resulting from a sneeze. Image courtesy of the Public Health Image Library. (No. 11162).



Hospitals- Need to review their IPC policy and strategy (Slide 1 /2)

All hospitals should have an IPC Programme with a dedicated and trained team or at least an IPC focal point in place and supported by senior management and health authority

- Assessment and triage of patients with acute respiratory symptoms
- Patient placement in isolation facility
- Implementation of [Standard](#), Contact, and Airborne Precautions, including the use of eye protection
- Visitor management and exclusion
- Source control measures for patients (e.g., put facemask on suspect patients)
- Requirements for performing aerosol generating procedures
- Be alert to case definitions and know how to report a potential 2019-nCoV case

Hospitals- Need to review their IPC policy and strategy (slide 2/2)

- ☐ PPE available and staff trained in donning/ doffing
- ☐ Provision for mechanical ventilation and ICU care
- ☐ Protocol for environmental cleaning and disinfection
- ☐ System for proper collection and disposal of contaminated medical waste
- ☐ Policies to test and isolate any HCWs coming in contact with patients
- ☐ An infection control team, responsible for monitoring daily activities and to follow up any exposed Health care worker

Use Standard Precautions at all Times

It is not possible to always identify patients with novel coronavirus early or without testing because symptoms and other features may be very non specific.

It is advisable to use Standard Precautions at all times, regardless.

STANDARD PRECAUTIONS

1. Promote a safety climate
2. Hand Hygiene
3. Wear PPE
4. Source Control- Respiratory Hygiene and Cough Etiquette
5. Environmental Management
6. Injection Safety

Clinical Triage- Setting it up

A system for assessing all patients at admission allowing early recognition of possible 2019-nCoV infection and immediate isolation of patients with suspected nCoV infection in an area separate from other patients(source control).

Healthcare facilities should:

- Encourage HCWs to have a high level of clinical suspicion
- Establish a well-equipped triage station at the entrance of health care facility, supported by trained staff
- Institute the use of screening questionnaires according to the updated case definition [https://www.who.int/publications-detail/globalsurveillance-for-human-infection-with-novelcoronavirus-\(2019-ncov\)](https://www.who.int/publications-detail/globalsurveillance-for-human-infection-with-novelcoronavirus-(2019-ncov))
- Post signs in public areas reminding symptomatic patients to alert HCWs.

Promote Hand Hygiene



Everyone in the health care environment must practice good hand hygiene, including all health care providers, patients, visitors, and volunteers.

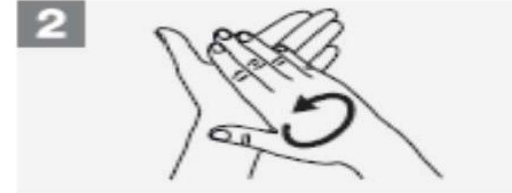
Effective Hand Washing



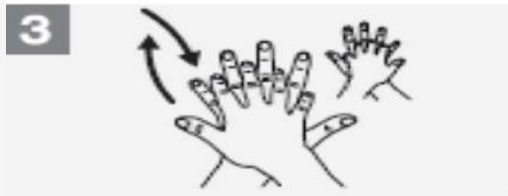
0 Wet hands with water;



1 Apply enough soap to cover all hand surfaces;



2 Rub hands palm to palm;



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



4 Palm to palm with fingers interlaced;



5 Backs of fingers to opposing palms with fingers interlocked;



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



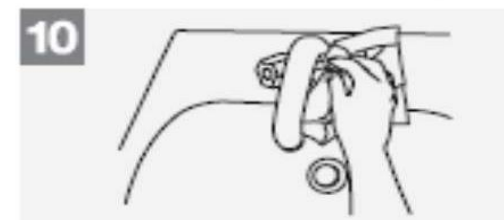
7 Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;



8 Rinse hands with water;



9 Dry hands thoroughly with a single use towel;

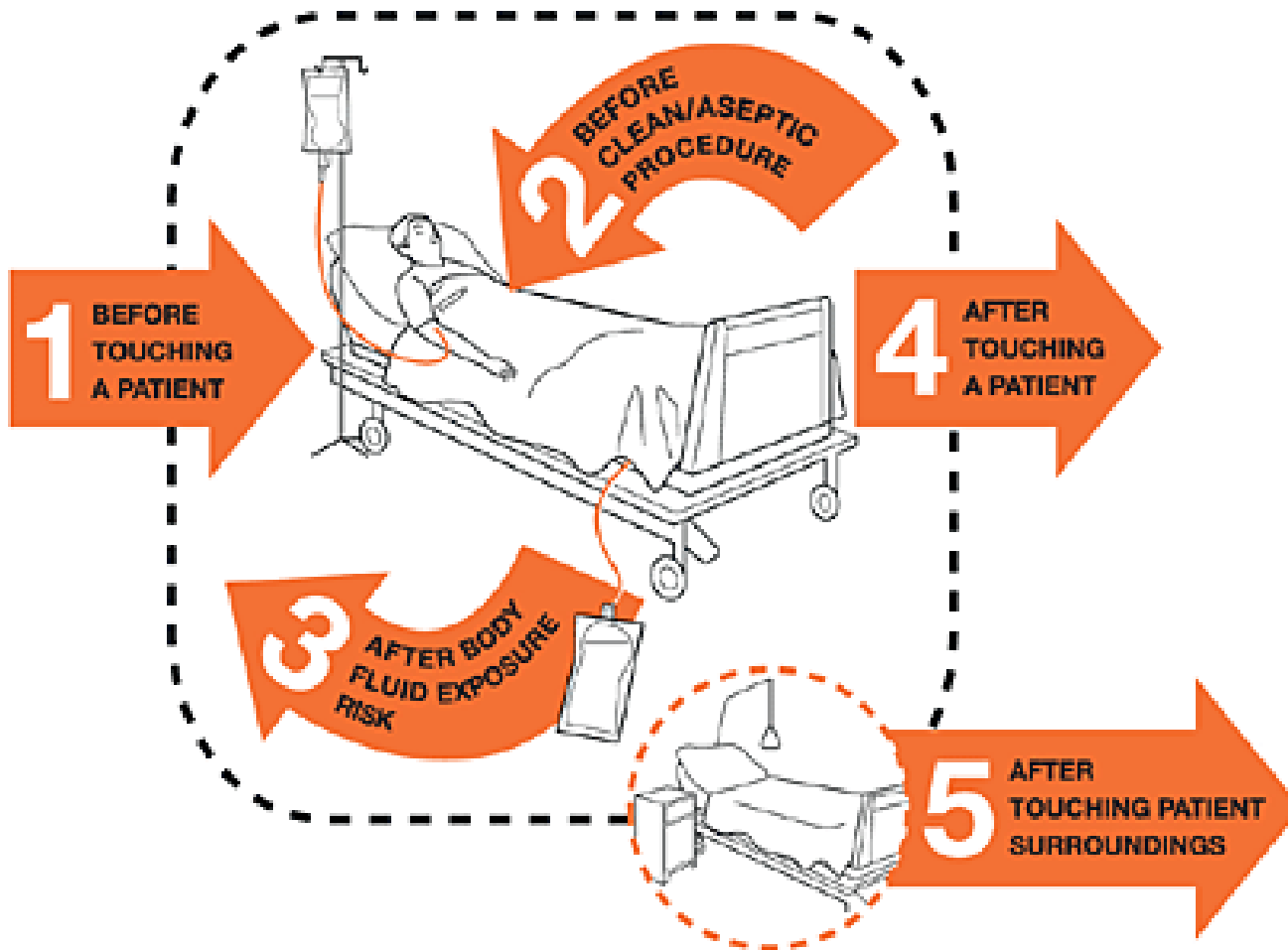


10 Use towel to turn off faucet;



11 Your hands are now safe.

5 Moments of Hand Hygiene



Hand hygiene¹

Summary technique:

- Hand washing (40–60 sec): wet hands and apply soap; rub all surfaces; rinse hands and dry thoroughly with a single use towel; use towel to turn off faucet.
- Hand rubbing (20–30 sec): apply enough product to cover all areas of the hands; rub hands until dry.

Summary indications:

- Before and after any direct patient contact and between patients, whether or not gloves are worn.
- Immediately after gloves are removed.
- Before handling an invasive device.
- After touching blood, body fluids, secretions, excretions, non-intact skin, and contaminated items, even if gloves are worn.
- During patient care, when moving from a contaminated to a clean body site of the patient.
- After contact with inanimate objects in the immediate vicinity of the patient.

Source Control Measures : Respiratory Hygiene and Cough Etiquette

Respiratory hygiene and cough etiquette

Persons with respiratory symptoms should apply source control measures:

- Cover their nose and mouth when coughing/sneezing with tissue or mask, dispose of used tissues and masks, and perform hand hygiene after contact with respiratory secretions.

Health-care facilities should:

- Place acute febrile respiratory symptomatic patients at least 1 metre (3 feet) away from others in common waiting areas, if possible.
- Post visual alerts at the entrance to health-care facilities instructing persons with respiratory symptoms to practise respiratory hygiene/cough etiquette.
- Consider making hand hygiene resources, tissues and masks available in common areas and areas used for the evaluation of patients with respiratory illnesses.



Personal Protective Equipment (PPE)

HOW TO PUT ON AND TAKE OFF

Personal Protective Equipment (PPE)



How to put on PPE (when all PPE items are needed)



Step 1

- Identify hazards & manage risk. Gather the necessary PPE.
- Plan where to put on & take off PPE.
- Do you have a buddy? Mirror?
- Do you know how you will deal with waste?



Step 2

- Put on a gown.



Step 3a

- Put on face shield.

OR

Step 3b

- Put on medical mask and eye protection (e.g. eye visor/goggles)



Note: If performing an aerosol-generating procedure (e.g. aspiration of respiratory tract, intubation, resuscitation, bronchoscopy, autopsy), a particulate respirator (e.g. US NIOSH-certified N95, EU FFP2, or equivalent respirator) should be used in combination with a face shield or an eye protection. Do user seal check if using a particulate respirator.



Step 4

- Put on gloves (over cuff).

How to take off PPE



Step 1

- Avoid contamination of self, others & the environment
- Remove the most heavily contaminated items first

Remove gloves & gown

- Peel off gown & gloves and roll inside, out
- Dispose gloves and gown safely



Step 2

- Perform hand hygiene



Step 3a

If wearing face shield:

- Remove face shield from behind
- Dispose of face shield safely



Step 3b

If wearing eye protection and mask:

- Remove goggles from behind
- Put goggles in a separate container for reprocessing
- Remove mask from behind and dispose of safely



Step 4

- Perform hand hygiene

The rational, correct, and consistent use of PPE also helps to reduce the spread of pathogens.

- Adequate and regular supplies
- Adequate staff training
- Appropriate hand hygiene and
- Appropriate human behavior.

Practice donning and Doffing PPE

Putting on a mask



Cup mask in your hand with the nosepiece at your fingertips allowing the headbands to hang freely below your hand.



Position mask under your chin with the nosepiece up.



Pull top strap over your head resting it high at the top back of your head.
Pull the bottom strap over your head and position it around the neck below ears.



Place fingertips of both hands at top of the metal nosepiece. Mould nosepiece to shape of your nose. Do not pinch nosepiece

Masks (2)

- Any respiratory aerosol-generating procedure (suctioning, intubation, nasopharyngeal swabbing) must NOT be performed without full PPE
 - (particulate respirator and not a surgical mask, long-sleeved gown, goggle, gloves)
- Particulate respirator masks should be used as per manufacturer's instructions. They should at least have a seal check performed (see picture)



Exhale sharply. If leakage, adjust position and/or tension straps. Retest the seal.

Inhale deeply. If no leakage, negative pressure will make respirator cling to your face.

Gowns

- A new gown should be worn for every patient contact or if resources limited, for every entry into inpatient respiratory ward
- The sleeve cuff should be tucked into the gloves
- Discard immediately if visibly contaminated.



The Order of Removal of PPE is Critical

Steps to **remove** personal protective equipment (PPE)

- 1** Remove waterproof apron and dispose of safely. If the apron is to be reused, place it in a container with disinfectant.



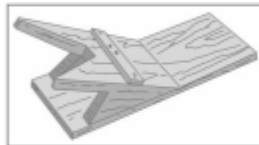
- 2** If wearing overshoes, remove them with your gloves still on (If wearing rubber boots, see step 4).



- 3** Remove gown and gloves and roll inside-out and dispose of safely.



- 4** If wearing rubber boots, remove them (ideally using the boot remover) without touching them with your hands. Place them in a container with disinfectant.



- 5** Perform hand hygiene.



- 6** If wearing a head cover, remove it now (from behind the head).



- 7** Remove face protection:

- 7a** Remove face shield or goggles (from behind the head). Place eye protection in a separate container for reprocessing.



- 7b** Remove mask from behind the head. When removing mask, untie the bottom string first and the top string next.



- 8** Perform hand hygiene.



How to Remove Gowns ??

Removing gowns

1

- *Unfasten ties*



2

- *Peel gown away from neck and shoulder*
- *Turn contaminated outside toward the inside*



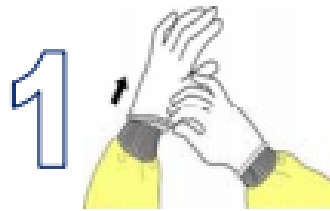
3

- *Fold or roll into a bundle*
- *Discard*



How to Remove Gloves ??

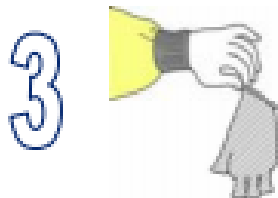
Removing gloves



- *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*

How to Remove Mask ??

Removing a mask

- Do NOT touch the mask itself.
- Lift the bottom elastic over your head first
- Then lift off the top elastic
- If no elastics, untie.
- Discard
- Wash hands afterwards.



Who should wear protective clothing ?

All doctors, nurses, and health workers who provide direct patient care to suspected nCoV patients.

All support staff who clean the isolation room, handle contaminated supplies and equipment, launder re-usable supplies, and collect and dispose of infectious waste

All laboratory staff who handle patient specimens and body fluids from suspected nCoV cases.

Laboratory support staff who clean and disinfect laboratory equipment used to test specimens.

Burial teams who remove bodies of deceased patients and prepare them for burial/ Cremation.

Family members who care for nCoV patients.

Patient Placement

In addition to using standard precautions, all individuals, including family members, visitors and HCWs, should use contact and droplet precautions before entering the room where suspected or confirmed nCoV patients are admitted

Patients should be placed in adequately ventilated single rooms

For general ward rooms with natural ventilation, adequate ventilation is considered to be 60 L/s per patient

when single rooms are not available, patients suspected of being infected with nCoV should be grouped together

all patients' beds should be placed at least 1 m apart regardless of whether they are suspected to have nCoV infection

where possible, a team of HCWs should be designated to care exclusively for suspected or confirmed cases to reduce the risk of transmission

limit the number of HCWs, family members and visitors who are in contact with a suspected and confirmed 2019-nCoV patient

maintain a record of all persons entering the patient's room, including all staff and visitors

Contact Precautions- Direct Transmission

This occurs when infectious agents are transferred from one person to another without a contaminated intermediate object or person.

For example, blood or other body substances from an infectious person may come into contact with a mucous membrane or breaks in the skin of another person.

Contact Precautions--Indirect transmission

This involves the transfer of an infectious agent through a contaminated intermediate object (fomite) or person. These include:

- Hands of HCWs
- Clothing after care of a patient colonized or infected with an infectious agent which can then be transmitted to subsequent patients;
- Patient-care devices that are shared between patients without cleaning and disinfection; and
- Environmental surfaces that are inadequately disinfected.

Additional PPE Requirements (for Contact, Droplet precautions)

HCWs should use a medical mask

HCWs should wear eye protection (goggles) or facial protection (face shield) to avoid contamination of mucous membranes

HCWs should wear a clean, non-sterile, long-sleeved gown

HCWs should also use gloves

The use of boots, coverall and apron is not required during routine care

After patient care, appropriate doffing and disposal of all PPE's and hand hygiene should be carried out

Also, a new set of PPE's is needed, when care is given to a different patient

HCWs should refrain from touching eyes, nose or mouth with potentially contaminated gloved or bare hands

Contact Precautions

(Prevent infection through direct or indirect contact with patients or patient care environment)

Taken in addition to Standard Precautions

Limit patient movement

Isolate or cohort patients

Gown + gloves for patient / room contact

Remove immediately after contact

Do not touch eyes, nose, mouth with hands

Avoid contaminating environmental surfaces

Negative Pressure Isolation Room

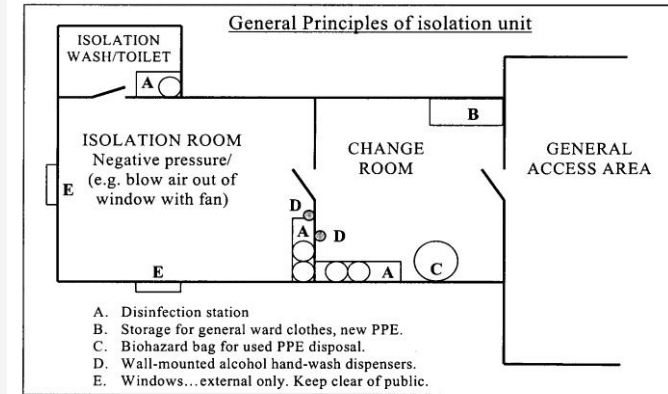
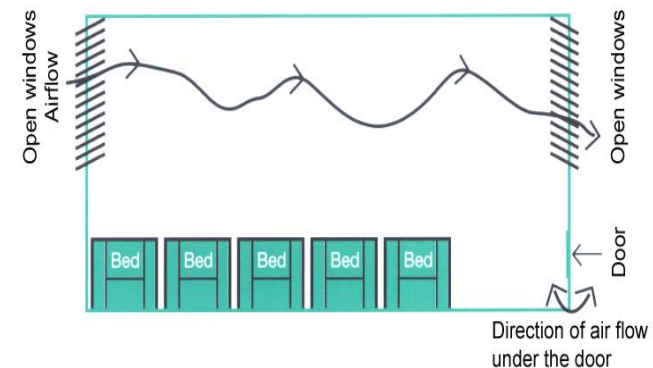


Figure 2. Natural ventilation; free flow of ambient air in and out through open windows.



Contact Precautions

Wash hands immediately after patient contact

Equipment should be either single-use and disposable or dedicated equipment

(e.g., stethoscopes, blood pressure cuffs and thermometers)

If Equipment needs to be shared, among patients, clean and disinfect it between use for each individual patient

(e.g., by using ethyl alcohol 70%)

Clean, then disinfect patient room daily, frequent cleaning and disinfection with a focus on frequently-touched surfaces and equipment in the immediate vicinity of the patient.

(eg. -Bed rails, Bedside tables, Lavatory surfaces, Blood pressure cuff, equipment surfaces)

Transfer of patients

Transfer of patients with suspected nCoV should be kept to minimum.

Ambulance crew and staff for the transfer should be informed of the patient's clinical condition, and advised of appropriate precautions.

Use appropriate PPE during the transfer. The used vehicle should be decontaminated after patient transportation.

Contaminated items and equipment should be properly disinfected or discarded.

Inform the receiving parties prior to transfer of patients to facilitate appropriate arrangement.

Airborne precautions for aerosol-generating procedures

Some aerosol-generating procedures have been associated with an increased risk of transmission of coronaviruses (SARS-CoV and MERS-CoV), such as tracheal intubation, non-invasive ventilation, tracheotomy, cardiopulmonary resuscitation, manual ventilation before intubation, and bronchoscopy. P

Procedures only in an adequately ventilated room using full PPE (N 95 mask)

that is, natural ventilation with air flow of at least 160 L/s per patient or in negative pressure rooms with at least 12 air changes per hour and controlled direction of air flow when using mechanical ventilation

use eye protection (i.e., goggles or a face shield), wear a clean, non-sterile, long-sleeved gown and gloves. If gowns are not fluid resistant, HCWs should use a waterproof apron for Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected

Limit the number of persons present in the room to the absolute minimum required for the patient's care and support.

Environmental Controls

Ensure that cleaning and disinfection procedures are followed consistently and correctly.

Cleaning environmental surfaces with water and detergent and applying commonly used hospital disinfectants (such as sodium hypochlorite) is an effective and sufficient procedure.

Cleaning should always be carried out from “clean” areas to “dirty” areas, in order to avoid contaminant transfer.

Manage laundry, food service utensils and medical waste in accordance with safe routine procedures.

Cleaning and Disinfection of the environment

Floors and horizontal work surfaces should be cleaned at least once/twice a day.

Dry sweeping with a broom should never be done. Cleaning with a moistened cloth helps to avoid contaminating the air with airborne particles.

Clean before you disinfect.

Change cleaning solutions and equipment frequently, as these items will get contaminated quickly (follow your hospital protocols).

Use of disinfectants

Bleach (sodium hypochlorite) 1% for disinfection of material contaminated with body fluids

Several concentrations may be marketed (e.g., 2.5%, 5%)

- ❑ If 5% solution available, mix 1 part 5% solution with 5 parts clean water

- ❑ If 2.5% solution available, mix 2 parts 2.5% solution with 5 parts clean water

Clean and disinfect patient areas daily, with particular attention to frequently touched surfaces – counter tops, door handles, medical equipment.

Use bleaching powder (7g/1L water ie 70% available chlorine) for disinfection of toilets/bathrooms

Administrative Measures

- Train and educate Health care workers on strict adherence to IPC
 - Dedicated and assigned HCWs
 - Monitoring of health of HCWs
 - PPE stock management
 - Strict Visitor Policy
 - Patient's relatives/ attendants should be educated on mode of transmission, hand hygiene and PPE
- Restrict access
 - Minimize the number of entries and exits to the respiratory inpatient ward.
 - Limit visitors
 - 8-hour shift limit for health-care workers on duty in the respiratory inpatient ward.

All specimens for lab investigations- Potentially infectious

Ensure that HCWs who collect specimens use appropriate PPE

All personnel who transport specimens need to be trained in safe handling practices and spill decontamination procedures

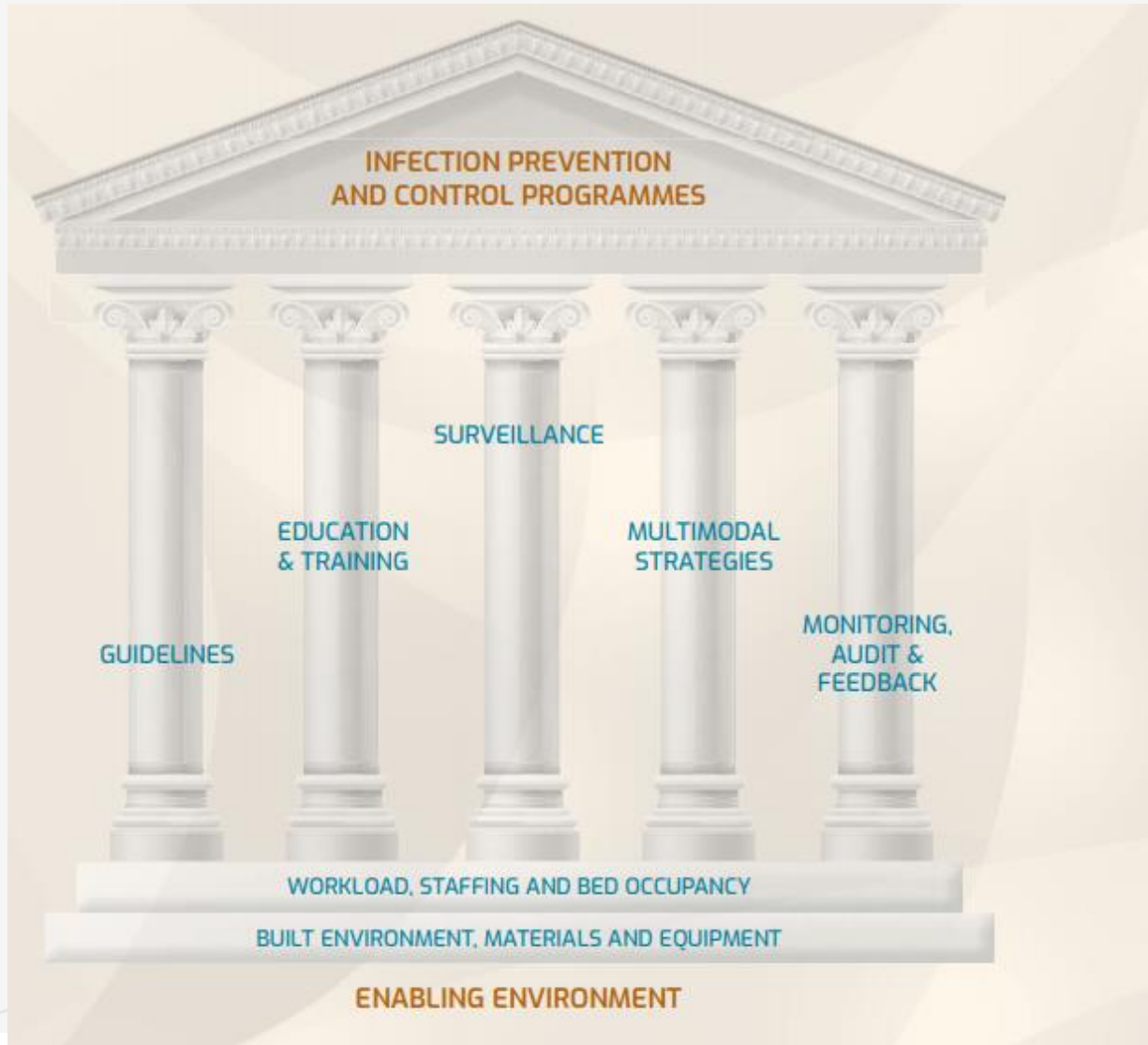
Place specimens for transport in leak-proof specimen bags (i.e., secondary containers) that have a separate sealable pocket for the specimen (i.e., a plastic biohazard specimen bag), with the patient's label on the specimen container (i.e., the primary container), and a clearly written laboratory request form

Deliver all specimens by hand whenever possible

Document clearly each patient's full name, date of birth and suspected nCoV of potential concern on the laboratory request form.

Notify the laboratory as soon as possible that the specimen is being transported.

WHO recommends a **multimodal strategy** for IPC activities to improve practices and reduce Hospital associated Infections (HAIs)



National Guidelines for Infection prevention and Control

For Further Details, please refer

[Infection prevention and control during health care when novel coronavirus \(nCoV\) infection is suspected](#)

WHO Interim guidance

25 January 2020

| Publication

[National Guidelines for Infection Prevention and Control in Healthcare Facilities, Ministry of Health and Family Welfare, Government of India](#)

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