Hospital Preparedness
Infection Prevention and Control for COVID-19

Refresher IPC training

HAI Surveillance Network, AIIMS – ICMR – NCDC

Presented by:

Updated as of 20 May 2021

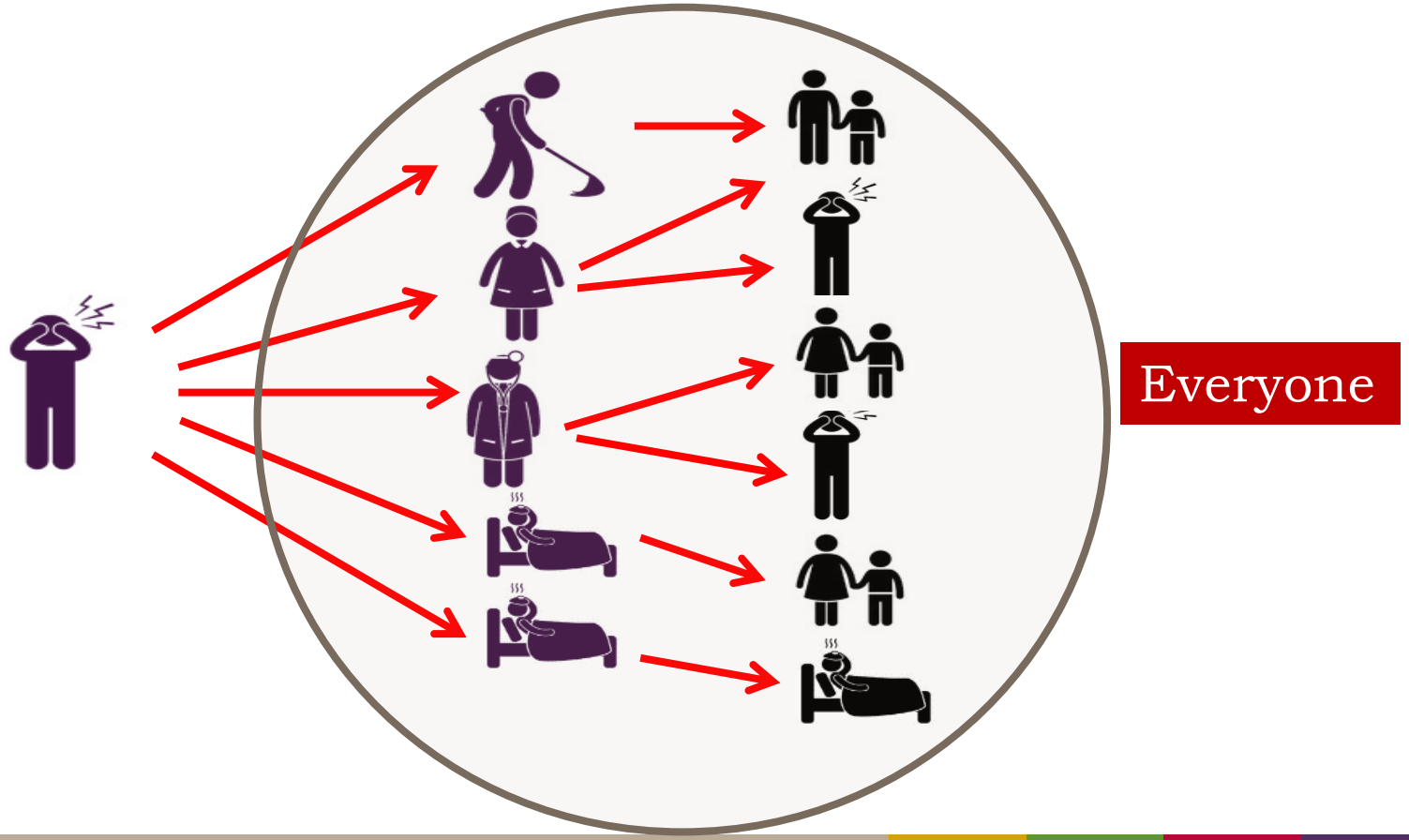
CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Infection Control and Prevention Topics Covered

- Introduction to IPC
- COVID-19 Transmission and IPC strategies (Updated as of 20 May 2021)
- Standard Precautions; PPEs (Updated as of 20 May 2021)
- PPE Optimization; Use, Reuse and Extended Use (Updated as of 20 May 2021)
- Triage, Early Identification, and Source Control (Updated as of 20 May 2021)
- Surveillance of Staff and Patients for COVID-19 (Updated as of 20 May 2021)
- Environmental Cleaning and Disinfection (Updated as of 20 May 2021)
- Biomedical Waste management (Updated as of 20 May 2021)
- Airborne Infection Control- Ventilation (Updated as of 20 May 2021)

Introduction to IPC

Who is at Risk?



Benefits of IPC

Protecting yourself

Protecting your patients

Protecting your family, community & environment

WHO 2015 Liberia Safe & Quality Health Services Package

IPC Goals in Outbreak Preparedness in Healthcare Facilities

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

COVID-19 Transmission and IPC strategies

Modes of Transmission of SARS CoV-2 / COVID-19 Virus (based on current evidence)

Three principal modes

- **Inhalation** of air carrying very small fine droplets and aerosol particles that contain infectious virus. Risk of transmission is greatest within three to six feet of an infectious source where the concentration of these very fine droplets and particles is greatest
- **Deposition** of virus carried in exhaled droplets and particles onto exposed mucous membranes (i.e., “splashes and sprays”, such as being coughed on). Risk of transmission is likewise greatest close to an infectious source where the concentration of these exhaled droplets and particles is greatest
- **Touching** mucous membranes with hands soiled by exhaled respiratory fluids containing virus or from touching inanimate surfaces contaminated with virus
  - Current evidences states the chances are surface transmission are 1/10000

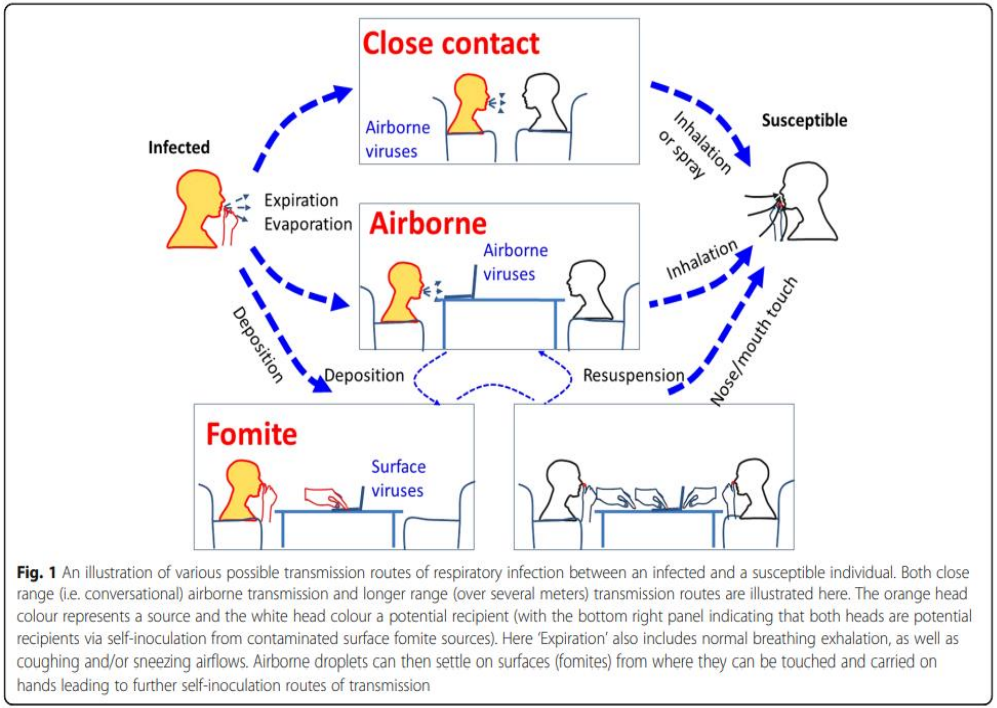


Fig. 1 An illustration of various possible transmission routes of respiratory infection between an infected and a susceptible individual. Both close range (i.e. conversational) airborne transmission and longer range (over several meters) transmission routes are illustrated here. The orange head colour represents a source and the white head colour a potential recipient (with the bottom right panel indicating that both heads are potential recipients via self-inoculation from contaminated surface fomite sources). Here ‘Expiration’ also includes normal breathing exhalation, as well as coughing and/or sneezing airflows. Airborne droplets can then settle on surfaces (fomites) from where they can be touched and carried on hands leading to further self-inoculation routes of transmission

Recognition of aerosol transmission of infectious agents: a commentary (biomedcentral.com)

Droplet (unmc.edu)
Scientific Brief: SARS-CoV-2 Transmission | CDC
Science Brief: SARS-CoV-2 and Surface (Fomite) Transmission for Indoor Community Environments | CDC

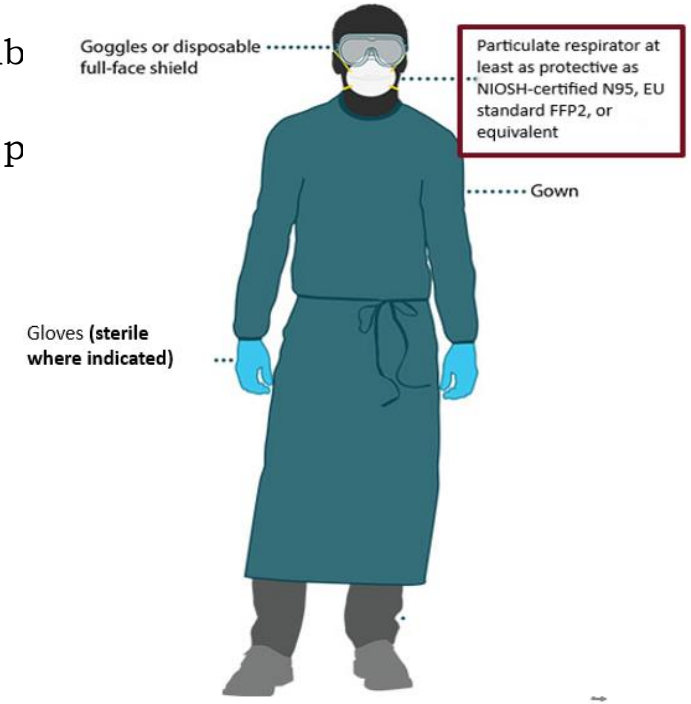
Aerosol Generating Procedures

Procedures or support treatments that generate aerosols are high risk for COVID -19 transmission within the health facility if adequate PPEs not worn

- Endotracheal incubation
- Tracheostomy
- Open suctioning
- Manual ventilation before intubation
- Non-invasive positive pressure ventilation (BI-PAP, CPAP etc.)
- Cardiopulmonary resuscitation
- Nebulisation
- Ear Nose Throat procedures
- Dental procedures etc.

Aerosol Generating Procedures (AGP) Require Additional Precaution

- Resuscitation techniques Viz Ambu bag ventilation, intub considered as aerosol generating procedures (AGP)
- Both Invasive and noninvasive ventilation(BiPAP, CPAP) p
- **Perform AGPs in adequately ventilated rooms**
  - Negative pressure room (at least 12 air changes/hour)
  - Natural ventilation (air flow at least 160 L/s per patient)
- **Wear appropriate PPE**
  - Gloves (sterile where indicated)
  - Particulate respirator (N-95/FFP 2/ FFP 3 or Equivalent
  - Eye protection (goggles or face shield)
  - Gown (long-sleeved)



https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Finfection-control%2Fcontrol-recommendations.html

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

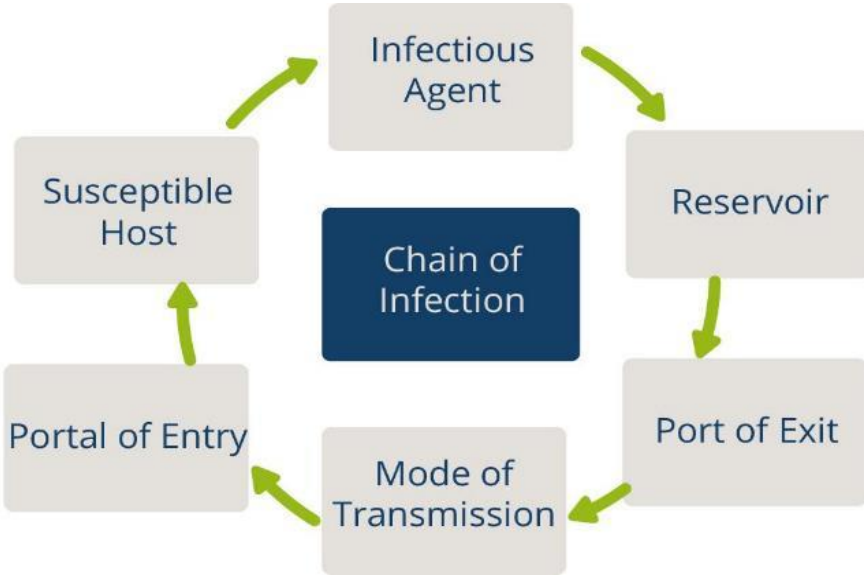
Standard Precautions; PPEs

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

Chain of Transmission

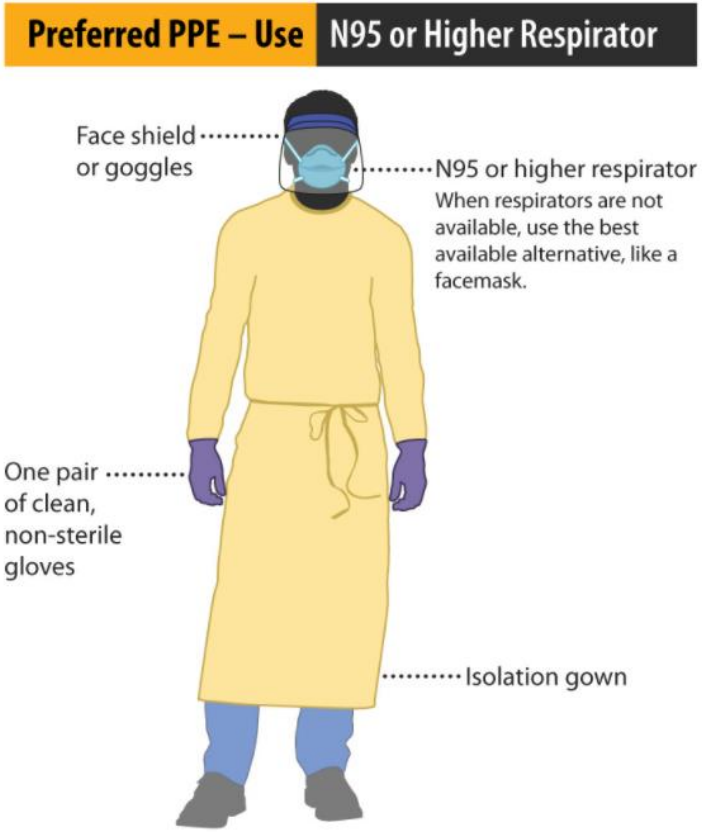


- For an infection to spread, **<u>all links must be connected</u>**
- **<u>Breaking any one link,</u>** will **stop disease transmission!**

Elements of Standard Precautions

- Hand hygiene
- Respiratory hygiene (cough etiquette)
- PPE according to the risk
- Safe injection practices, sharps management and injury prevention
- Safe handling, cleaning and disinfection of patient care equipment
- Environmental cleaning
- Safe handling and cleaning of soiled linen
- Waste management

Minimize Direct Unprotected Exposure



Using Personal Protective Equipment (PPE) | CDC

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
- Perform hand hygiene after doffing PPE
- Forecast your PPE need and avoid shortages
- If there is a shortage, follow WHO /CDC/ MoHFW guideline for extended use and Reuse of certain PPE
- **Clean and disinfect reusable PPE between each use**

Principles of PPE Use (2)

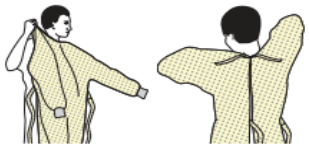
- **Change PPE immediately if it becomes soiled/ contaminated or damaged**
- PPE **should not be adjusted or touched during patient care**
- Never touch your face while wearing PPE
- if there is concern and/or breach of these practices
  - leave the patient care area when safe to do so
  - properly remove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

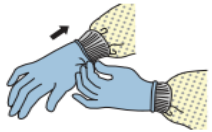
- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator

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

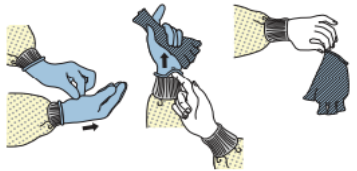
- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene

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

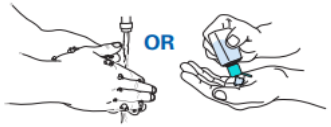
3. GOWN

- 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

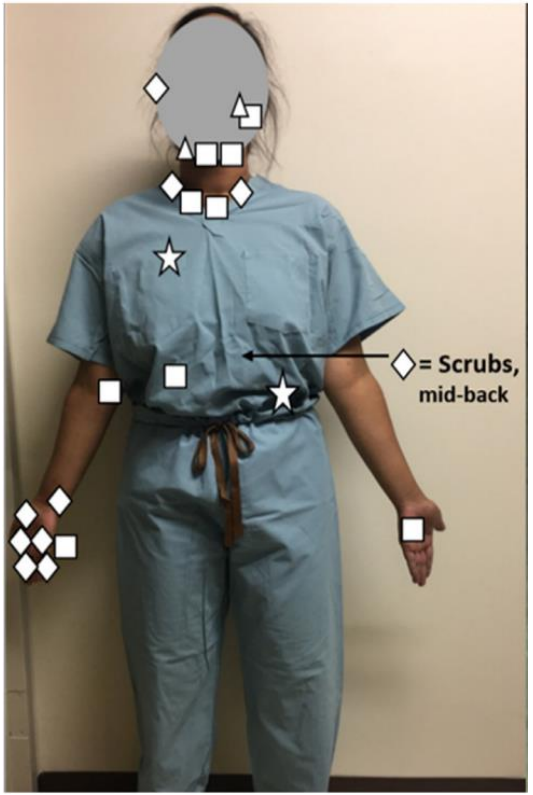
5. WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE



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

Common Sites of Self Contamination

- Observation when doffing PPE,
  - HCWs frequently self contaminated with both a surrogate marker and live S epidermidis.
  - Gowns and gloves may limit the bioburden of potential pathogens on provider skin and clothing
  - close attention to doffing technique is necessary
- Limited evidence in simulations that extra HH steps on gloved hands or double gloving would be more effective in preventing self-contamination
- Able to culture viable fluorescent S epidermidis from some provider hands after doffing simulation, after use of 70% alcohol-based hand rub as a final step.
  - Quality of HH performed by providers likely poor.



Alternativedoffingstrategiesofpersonalprotectiveequipmenttopreventself-contaminationinthehealthcaresetting (1).pdf

Standard

One Step (OS)

HH

Remove second glove

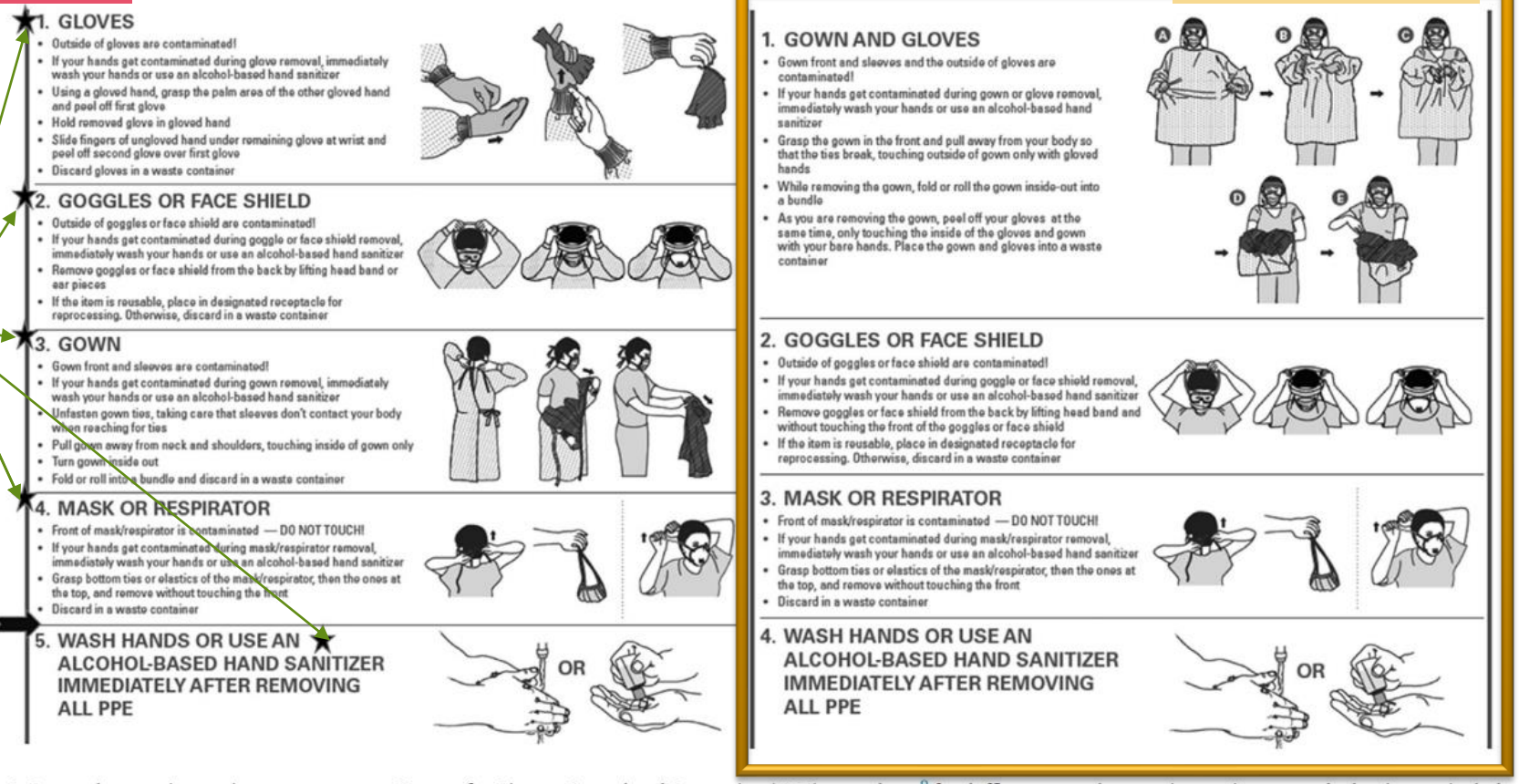


Fig 1. Personal protective equipment sequences. Centers for Disease Control and Prevention (CDC) procedures[9] for doffing personal protective equipment and adaptions to include double gloving or additional hand hygiene events. Study procedures are as follows. (1) CDC standard, left panel. (2) CDC alternative/one-step, right panel. (3) Hand hygiene, left panel with additional hand hygiene steps depicted by stars. (4) Double glove, left panel with removal of inner glove pair inserted between steps 4 and 5 (arrow).

Alternativedoffingstrategiesofpersonalprotectiveequipmenttopreventself-contaminationinthehealthcaresetting (1).pdf

With limited sample size – One Step PPE removal had lowest self contamination rate

Table 2
Locations of contamination for each doffing procedure

Contamination and locations	Standard (N = 12)	HH (N = 14)	DG (N = 10)	OS (N = 15)	*P* value
Fluorescent powder					
R hand	8	9	2	5	—
L hand	6	8	3	6	—
R arm	2	4	2	3	—
L arm	5	4	2	3	—
R wrist	4	4	2	1	—
L wrist	2	3	3	1	—
Neck	5	11	3	4	—
Ear	4	1	1	1	—
Face	4	5	4	2	—
Scrubs	3	5	3	3	—
No. of participants with any contamination	11 (92%)	14 (100%)	9 (90%)	12 (80%)	.07
Green fluorescent protein secreting *Staphylococcus epidermidis*					
R hand	5	1	0	0	—
L hand	0	1	0	0	—
R arm	0	1	0	0	—
L arm	0	0	0	0	—
R wrist	1	0	0	0	—
L wrist	0	0	0	0	—
Neck	2	2	0	0	—
Ear	1	0	0	0	—
Face	0	3	2	0	—
Scrubs	1	1	0	2	—
No. of participants with any contamination	8 (70%)	7 (50%)	2 (20%)	2 (13%)	.02

DG, double glove; *HH*, hand hygiene; *L*, left; *OS*, one-step; *R*, right.

Alternativedoffingstrategiesofpersonalprotectiveequipmenttopreventself-contaminationinthehealthcaresetting (1).pdf

Areas Commonly Missed after Performing Hand Hygiene

BACK OF HAND

(Adapted from Taylor L (1978), An evaluation of hand washing techniques - I, Nursing Times, 12 January, pp 54-55)

PALM OF HAND

http://www.emed.ie/Infections/Hand_Washing.php

Do IPC expert groups recommend double gloving ?

IPC EXPERT GROUP	Recommend double gloving ?	Comment
CDC	NO	does not recommend double gloves when providing care to suspected or confirmed 2019-COVID patients
ECDC	NO	"There is no direct evidence that the use of gloves increases protection against COVID-19, when compared with proper hand hygiene alone"
WHO	Not Mentioned	did not include any mention of double gloves in their IPC guidance for COVID-19 patients
ISDA	NO	panel found insufficient evidence for the use of double gloves

Personal Protective Equipment: Questions and Answers | CDC
Infection prevention and control for the care of patients with 2019-nCoV in healthcare settings- edited (europa.eu)
Rational use of personal protective equipment (PPE) for coronavirus disease (COVID-19): interim guidance, 19 March 2020 (who.int)
IDSA Guidelines on Infection Prevention in Patients with Suspected or Known COVID-19 (idsociety.org)

Is decontamination of gloves recommended as standard practice?

NO

- CDC does not recommend disinfection of disposable medical gloves as standard practice.
  - This practice is inconsistent with general disposable glove usage, but, in times of extreme disposable medical glove shortages, this option may need to be considered
  - Disposable medical gloves can be disinfected for up to six (6) applications of ABHS. With soap and water up to 10 times with diluted bleach solution up to 10 times or until the gloves become otherwise contaminated or ineffective
- Maximum of four hours of continuous use
- There is potential for perforation with prolonged use that is not visible to eye
- There is concern that disinfectants have an effect on glove integrity

Strategies for Optimizing the Supply of Disposable Medical Gloves | CDC
Infection prevention and control for the care of patients with 2019-nCoV in healthcare settings- edited (europa.eu)

What is the durability of examination gloves?

Purpose of study was to assess the risk of perforation of examination gloves

Methods

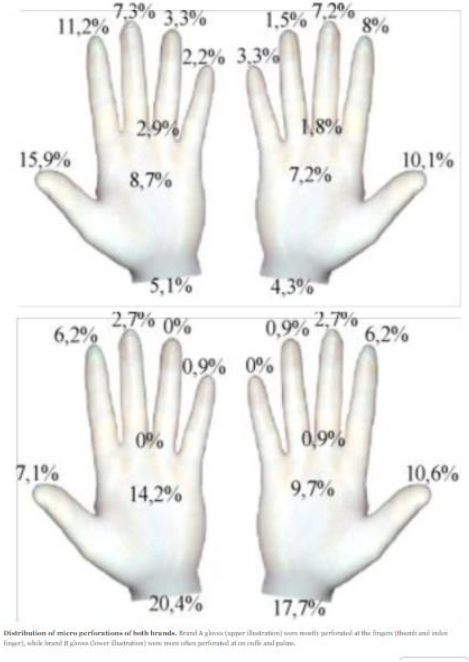
- 1500 consecutively used pairs of examination gloves of two different brands and materials (latex and nitrile)
- Study done over period of two months in two ICU's.
- Used gloves were examined for micro perforations using the "water-proof-test"

Results

- Only 26% of gloves were worn longer than 15 min.
- The total perforation rate was 10.3%
- Significant differences and deterioration of integrity of gloves between brands ($p<0.001$).
- Change of wound dressing" ($p = 0.049$) and washing patients ($p = 0.001$) were significantly associated with risk of perforation.

Conclusion

- Medical gloves show marked differences in their durability
- Changing of gloves after 15 min could be a good compromise between feasibility and safety.



Hübner, NO., Goerdt, AM., Mannerow, A. et al. The durability of examination gloves used on intensive care units. BMC Infect Dis 13, 226 (2013). https://doi.org/10.1186/1471-2334-13-226

Does wearing Gloves prevent disease transmission?

NO

Several studies show gloves carry microbes and transmit disease

Wearing gloves without or even with performing hand hygiene before and after contact with a COVID-19 positive patient does not eliminate the risk of COVID-19/microbe transmission to the mucosal surfaces of a healthcare worker or patients.

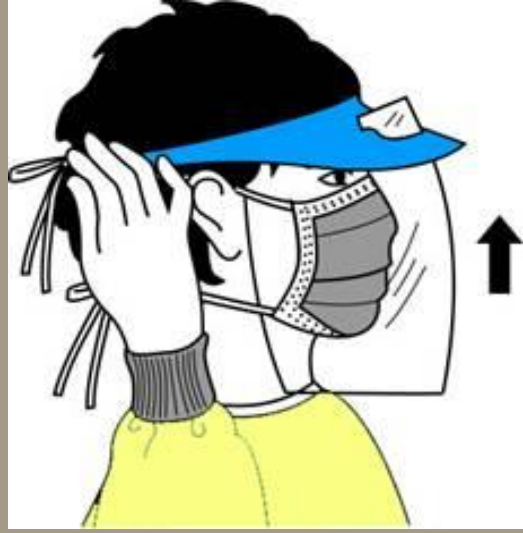
https://www.journalofhospitalinfection.com/article/S0195-6701(13)00381-2/fulltext
https://www.sciencedirect.com/science/article/abs/pii/S0195670104001057
https://academic.oup.com/cid/article/69/Supplement_3/S224/5568510

Can wearing Gloves lead to poor IPC practice and increased risk of disease transmission?

Yes

- Literature found gloves give a false sense of security to the user.
- This can lead to poor IPC practices and an increased risk of disease transmission.
- Rates of compliance with hand hygiene are significantly lower with improper gloving
- Studies show we frequently touch our faces, often unconsciously. This risks self-contamination from gloves or hands.
- HCP should prioritize adherence to standard precautions.

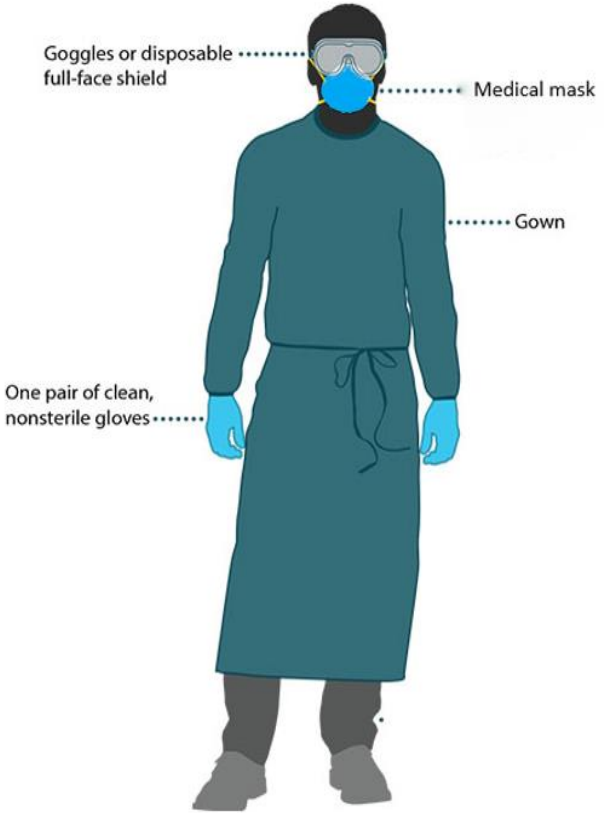
"The Dirty Hand in the Latex Glove": A Study of Hand Hygiene Compliance When Gloves Are Worn | Infection Control & Hospital Epidemiology | Cambridge Core
A study quantifying the hand-to-face contact rate and its potential application to predicting respiratory tract infection - PubMed (nih.gov)
Face touching: A frequent habit that has implications for hand hygiene - ScienceDirect



PPE Optimization
Use, Reuse and Extended Use

How to ration PPE use?

- Personal Protective Equipment (PPE) must be rationally used for activities commonly performed by HCWs
- Use of PPE should be based on transmission based precautions (TBPs)
- HCWs involved in direct care of COVID-19 patients should wear appropriate PPE
  - Gloves (non-sterile, examination)
  - **Medical mask**
  - Eye protection (goggles or face shield)
  - Gown (long-sleeved, non-sterile)

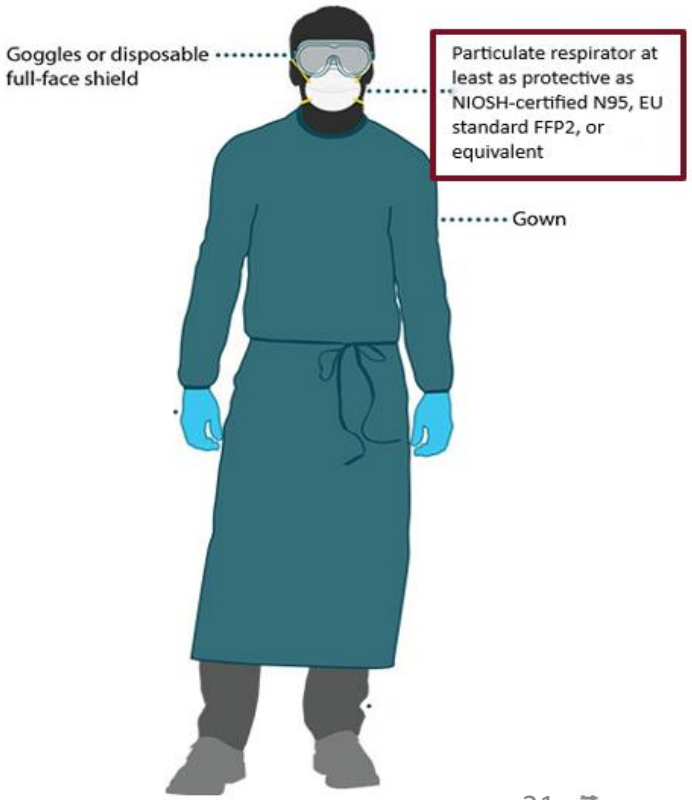


*Note: information on this slide is PPE as recommended by WHO

COVID-19: Guidance for infection prevention and control in healthcare settings. Version 1.0. https://apps.who.int/iris/handle/10665/331215

Aerosol Generating Procedures (AGP) require additional PPE

- AGPs associated with increased risk of transmission of other coronaviruses (SARS-CoV and MERS-CoV)
- Perform AGPs in adequately ventilated rooms
  - Negative pressure room (**at least 12 air changes/hour**)
  - **Natural ventilation (air flow at least 160 L/s per patient)**
- Wear appropriate PPE
  - Gloves (sterile where indicated)
  - **Particulate respirator** (N-95/FFP 2/ FFP 3)
  - Eye protection (goggles or face shield)
  - Gown (long-sleeved, non-sterile)

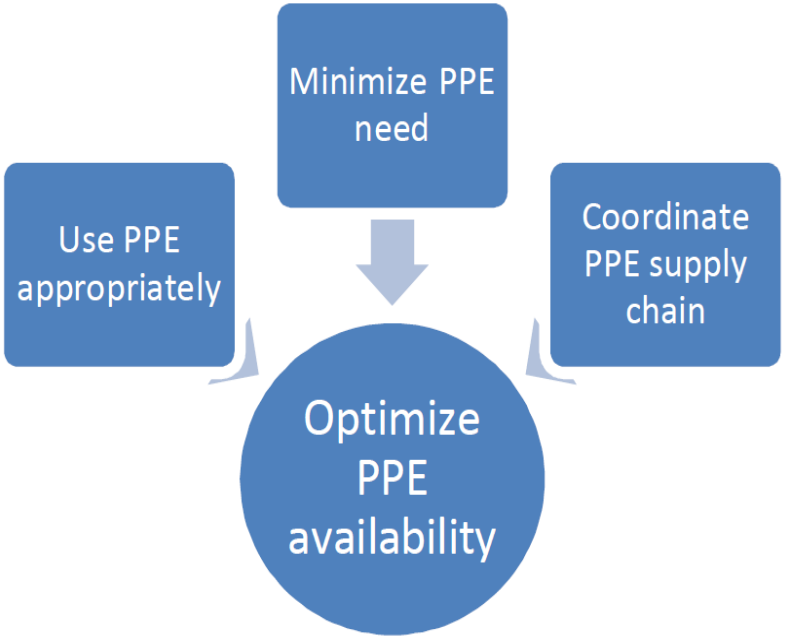


*Note: information on this slide is PPE as recommended by WHO

How do we handle shortages of PPE?

Strategies to optimize the availability of PPE

- **Minimize need for PPE**
  - Consider telemedicine for patient care
  - Use physical barriers (i.e.. glass/ plastic windows)
  - Restrict HCW not involved in direct patient care from entering rooms of COVID-19 patients
- **Coordinate PPE supply chain management mechanism**
  - Forecast PPE use
  - Monitor and control PPE request
  - Monitor end to end distribution



https://apps.who.int/iris/bitstream/handle/10665/331498/WHO-2019-nCoV-IPCPPE_use-2020.2-eng.pdf

Can PPEs be re-used?

- **In the context of limited supplies, consider**
  - Using reusable personal protective equipment where options exist (e.g., cloth gowns, reusable goggles or face shields)
  - Make sure manufacturer's instructions for reprocessing are followed (i.e., cleaning and disinfecting)
- **Assign personnel as needed to:**
  - Ensure equipment are correctly reprocessed after each use
  - Ensure reusable PPE are routinely inspected, maintained and replaced when needed
    - mend a small hole in a gown, replace missing fastening ties
    - dispose of cloth gowns when they are thin or ripped

Guidelines for re-use of Personal Protective Equipment HICC, AIIMS, New Delhi
https://www.fda.gov/medical-devices/personal-protective-equipment-infection-control/faqs-shortages-surgical-masks-and-gowns

What are the possible ways N-95 respirators can be sterilized for reuse?

- **Periodic Reuse**
- **Promising methods**
  - Ultraviolet irradiation
  - Hydrogen peroxide vapour
  - Moist heat
- **Promising Methods with some limitations**
  - Steam sterilization
  - Liquid hydrogen peroxide
- **Method with serious limitations**
  - Ethylene oxide

Methods currently not recommended

- Autoclave
- Isopropyl Alcohol
- Soap
- Dry microwave irradiation
- Chlorine (bleach)

COVID-19 Decontamination and Reuse of Filtering Facepiece Respirators | CDC

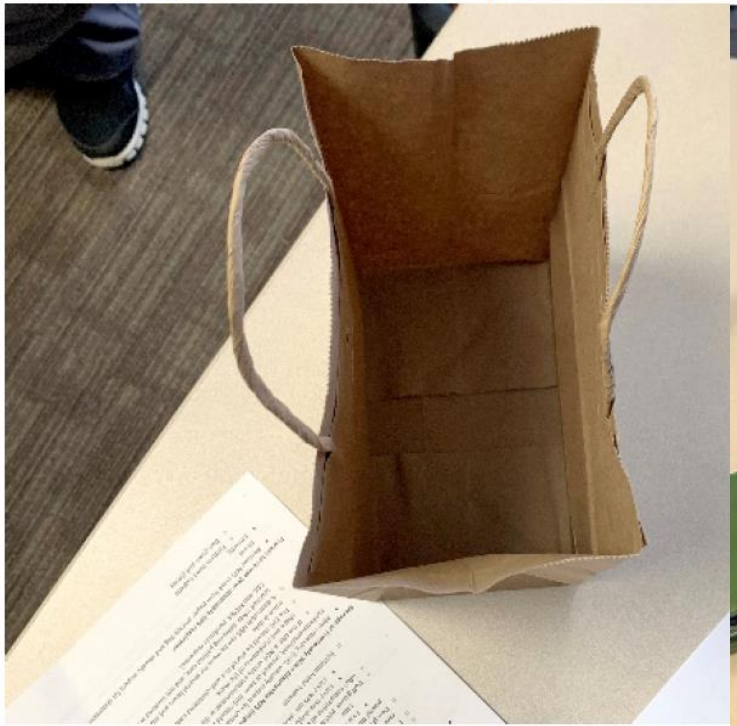
Can the N95 masks be reused after a set time period ?

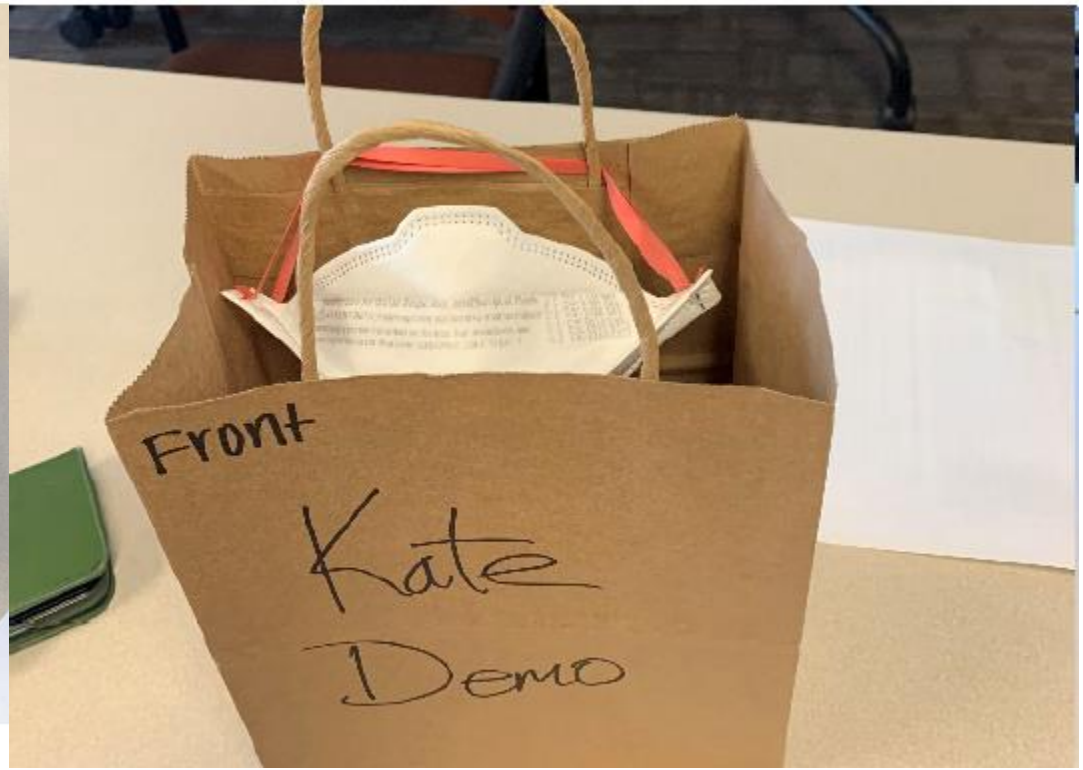
- SARS-COV-2 virus can survive up to 72 hours on plastic, stainless steel and cardboard surfaces
- One strategy
  - Issue five N95 respirators to each healthcare worker
  - The healthcare worker will wear one respirator each day and store it in a breathable paper bag at the end of each shift
  - Reuse with a minimum of five days between each Filtering Facepiece Respirator (FFR)
  - Healthcare workers should treat the FFRs as though they are still contaminated
  - If supplies are limited and five respirators are not available FFR decontamination may be necessary

COVID-19 Decontamination and Reuse of Filtering Facepiece Respirators | CDC

Can the N95 masks be reused after a set time period ?

The bag has to be open wide and stay that way.





https://snlg.iss.it/wp-content/uploads/2020/03/COVID-Extended-Use-Reuse-of-PPE-and-N95-ext.pdf

Can the N95 masks be reused after a set time period ?

https://snlg.iss.it/wp-content/uploads/2020/03/COVID-Extended-Use-Reuse-of-PPE-and-N95-ext.pdf

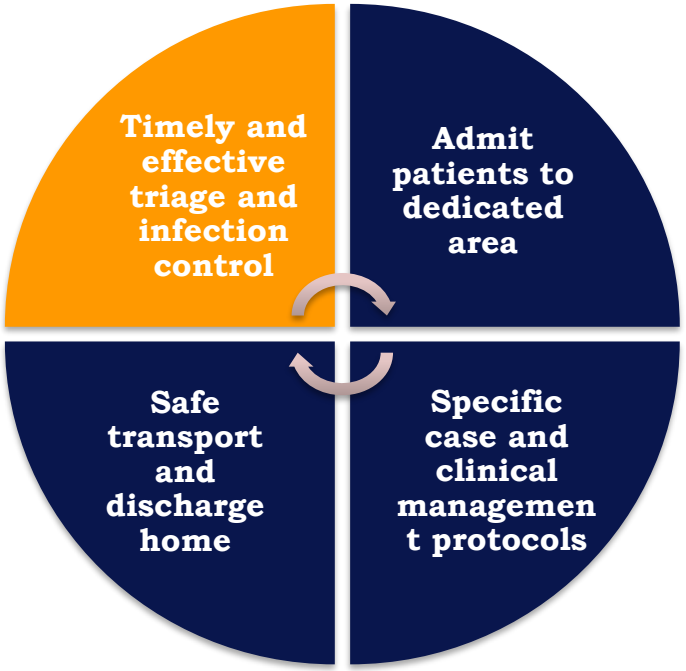
When should a healthcare worker get a new N95 ?

- After use during aerosol generating procedures
- If the respirators contaminated with
  - blood
  - respiratory or nasal secretions
  - other bodily fluids from patients
- Respirator is wet
- Following close contact with, or exit from, the care area of any patient co-infected with an infectious disease requiring contact precautions.
- It can no longer be properly fitted
- Breathing through the respirator becomes difficult

COVID-19 Decontamination and Reuse of Filtering Facepiece Respirators | CDC

Triage, Early Identification, and Source Control

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
- Follow standard precautions

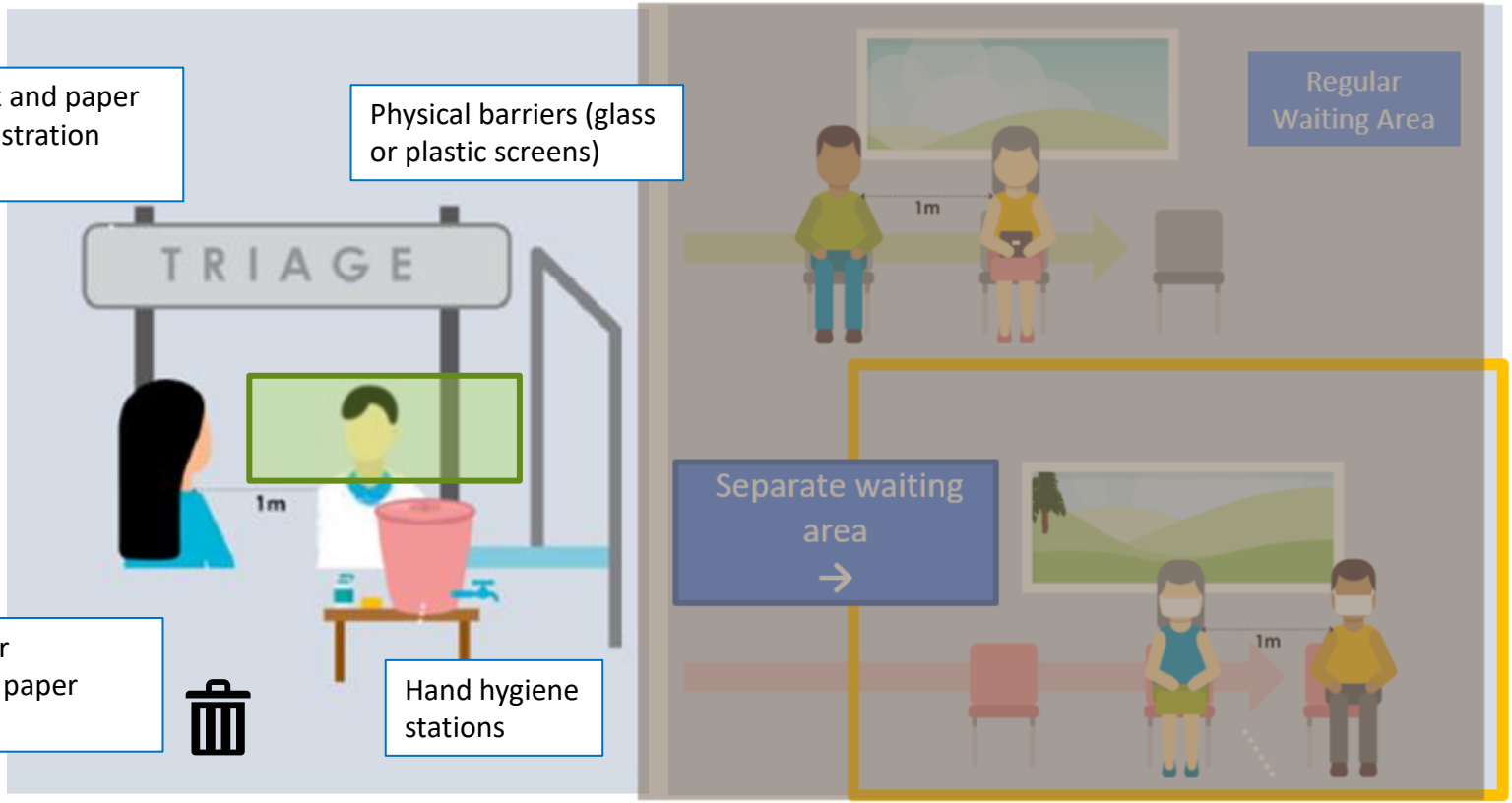
Equipment in Triage Area

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

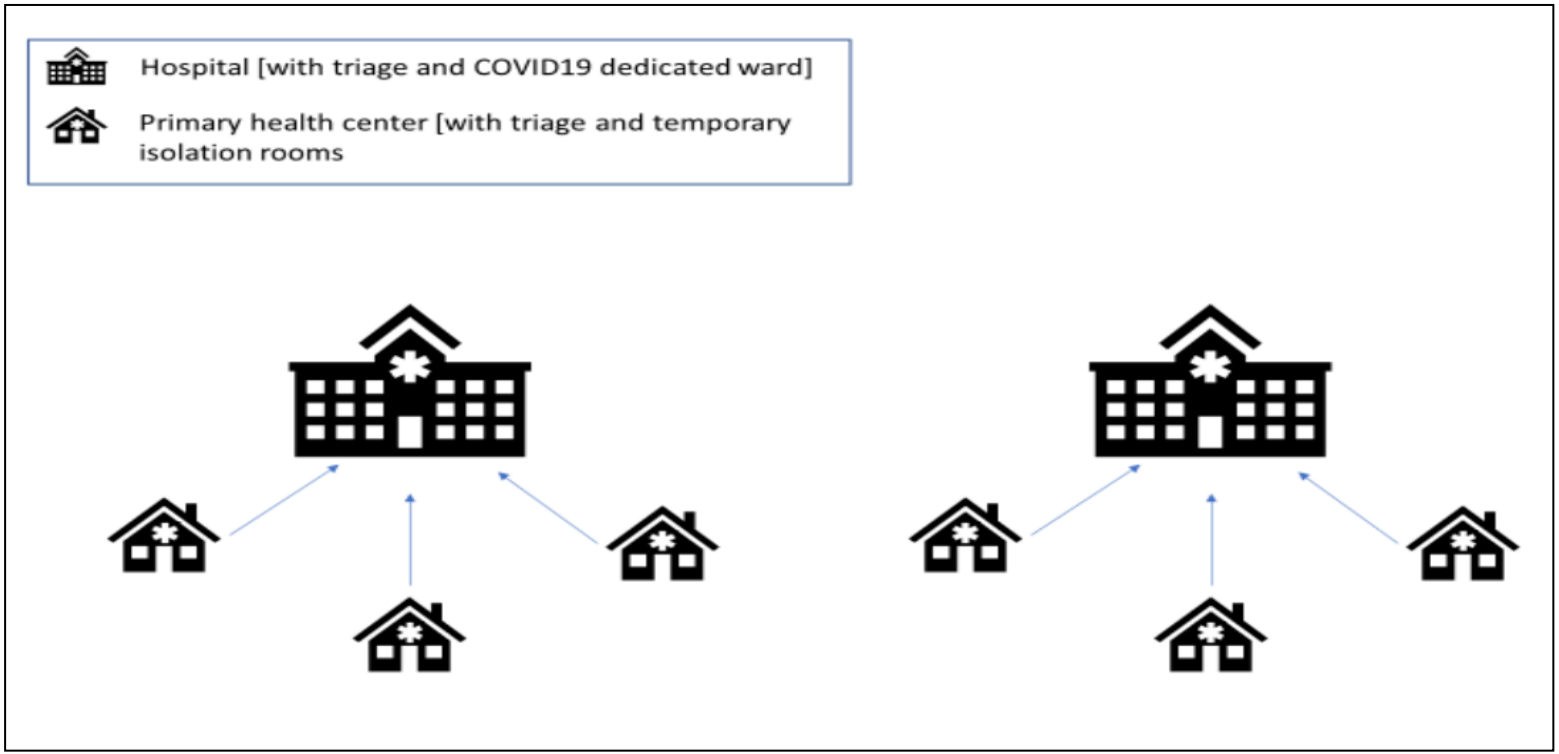
1. https://ncdc.gov.in/index1.php?lang=1&level=2&sublinkid=823&lid=617
2. https://www.paho.org/hq/index.php?option=com_docman&view=download&alias=51815-prehospital-emergency-medical-system-readiness-checklist-for-covid-19&category_slug=scientific-technical-materials-7990&Itemid=270&lang=en

Setting up Triage & Waiting Area



WPRO: The COVID-19 risk communication package for healthcare facilities

Hub and Spokes Model during Community Transmission



https://apps.who.int/iris/bitstream/handle/10665/331492/WHO-2019-nCoV-HCF_operations-2020.1-eng.pdf

Separate patients in waiting areas and maintain social distancing

Pictures from: ART Centre Kakinada - Andhra Pradesh

Surveillance of Staff and Patients for COVID-19

Risk Factors Associated With SARS-CoV-2 Seropositivity Among US Health Care Personnel

Study population:

- 24,749 health care personnel in 3 U.S. states.

Primary endpoint:

- SARS-CoV-2 seropositivity

Key findings:

- In this cross-sectional study, **community exposures (e.g., community contact, community cumulative incidence) were associated with seropositivity to SARS-CoV-2, but workplace factors were not.**
- These results suggest that current infection prevention practices in health care settings such as hospitals, rehabilitation facilities and skilled nursing facilities are effective in preventing transmission of SARS-CoV-2 from patients to health care personnel.

Limitations:

- Laboratory methods differed across sites
- Questionnaires were not standardized at each site.
- Risk factors included in the authors' multivariable model were limited to those that could be mapped from all sites.
- Infection control practices were not standardized across all sites, and the practices changed during the study period.
- This study included mostly urban/metropolitan settings

https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2777317

Many Healthcare Workers will get COVID-19 and can Transmit it to colleagues and patients.

- Study of 49,370 COVID-19 cases reported to CDC between Feb. 12 – Apr. 9, 2020
- Subset of these were HCW
  - (92%) HCP patients reported having at least one symptom among fever, cough, or shortness of breath, the remaining 8% did not report any of these symptoms.
  - Most HCP with COVID-19 (6,760, 90%) were not hospitalized;
    - severe outcomes, including 27 deaths, occurred across all age groups; deaths most frequently occurred in HCP aged ≥65 years.
  - Not all transmission can be attributed to healthcare-related exposure, with **a little more than half (55%) reported being exposed to COVID-19 only in a healthcare setting**

- KEY Findings:
  - Of all COVID-19 cases 3-11% in HCW
  - 92% Health works had symptoms of COVID-19. 8% No symptoms
  - 90% not hospitalized
  - Community Acquired Infections in HCW

https://www.cdc.gov/mmwr/volumes/69/wr/mm6915e5.htm?s_cid=mm6915e5_e&deliveryName=USCDC_921-DM25915

Are healthcare workers working in COVID-19 areas more at risk?

Where infections greater among staff wearing appropriate PPE working in "red" areas of the hospital, than "green areas"?

- "Red" area staff were 3 X more likely to be COVID-19 + than the "green" areas.
- Unanswered questions
  - If transmission occurred from patients to staff in red areas
  - Did staff get it at home?
  - Did staff get it from a colleague?
  - Unclear if representative of all HCF

- The implications - that hospitals need to introduce screening programmes across their workforces. Testing important tool to stop infection spreading within the hospital setting."

Rivett, L, et al. Screening of healthcare workers for SARS-CoV-2 highlights the role of asymptomatic carriage in COVID-19 transmission. eLife; 11 May 2020; DOI: 10.7554/eLife.58728

Passive Strategy

- **All healthcare workers self-assess for fever and/or a defined set of newly present symptoms that are indicative of COVID-19**

- If a healthcare worker has a fever or respiratory symptoms, they should:
  - **NOT** report to their facility
  - Remotely report their condition
  - Be provided with immediate medical assessment and follow-up actions

https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/guidance-identify-hcw-patients.html

Enhanced Passive Strategy

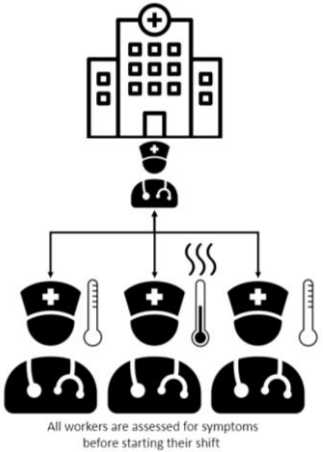
- In addition to the passive strategy, establishes a plan to **remind or prompt workers** to self-assess for symptoms consistent with COVID-19
- Common reminders include automated text messages or phone calls

https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/guidance-identify-hcw-patients.html

Active Strategy

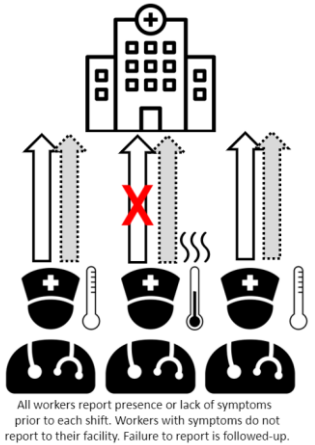
Remote active strategy

All healthcare workers required to report presence or lack of symptoms remotely prior to each shift



In-person active strategy

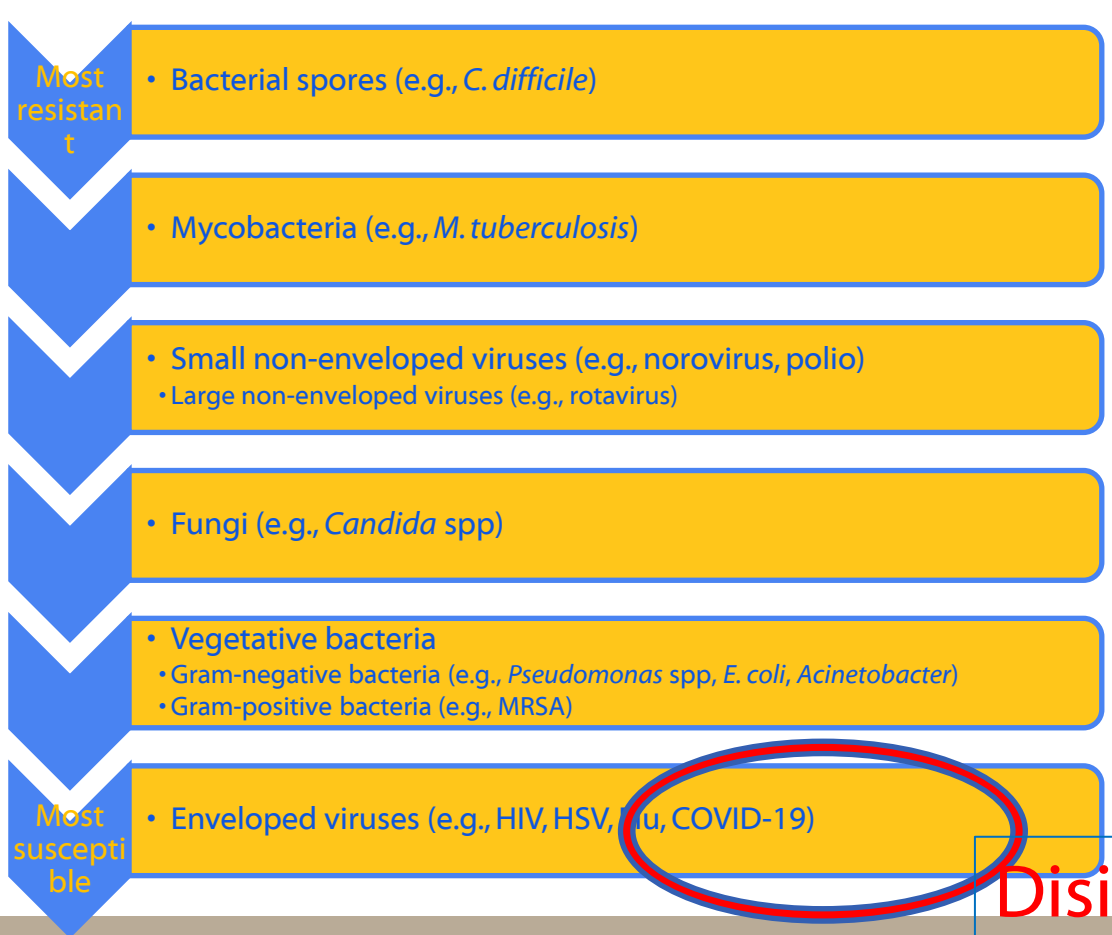
All healthcare workers are assessed for symptoms prior to each shift

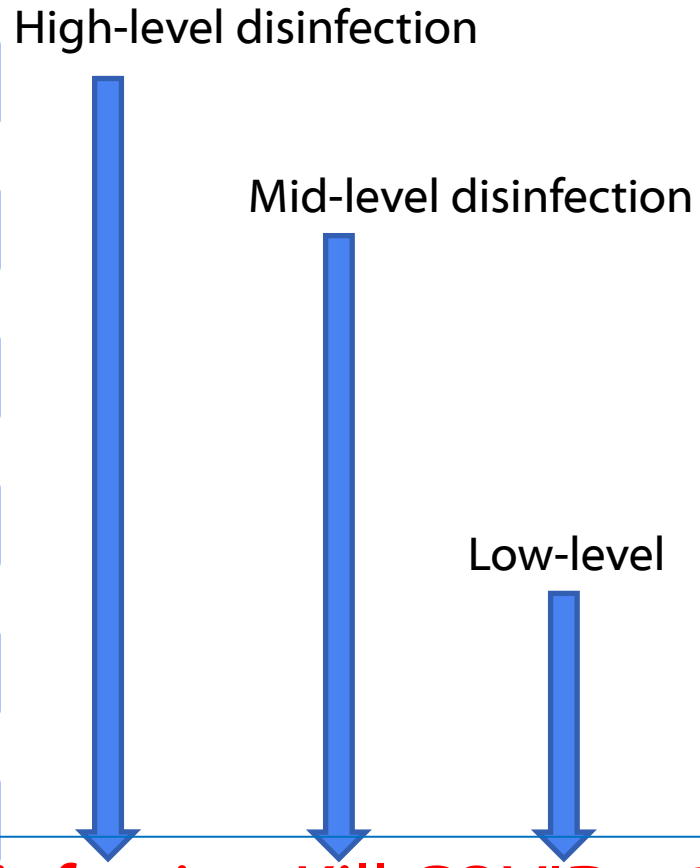


https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/guidance-identify-hcw-patients.html

Environmental Cleaning and Disinfection

Microbial disinfectant hierarchy – intrinsic resistance





Disinfection Kill COVID-19

Environmental Cleaning and Disinfection

Cleaning and disinfection of environmental surfaces in the context of COVID-19

Interim guidance

15 May 2020

World Health Organization

Background

Coronavirus disease 2019 (COVID-19) is a respiratory infection caused by SARS-CoV-2 (COVID-19 virus). The COVID-19 virus is transmitted mainly through close physical contact and respiratory droplets, while airborne transmission is possible during aerosol generating medical procedures.[1] At time of publication, transmission of the COVID-19 virus had not been conclusively linked to contaminated environmental surfaces in available studies. However, this interim guidance document has been informed by evidence of surface contamination in health-care settings[2] and past experiences with surface contamination that was linked to subsequent infection transmission in other coronaviruses. Therefore, this guidance aims to reduce any role that fomites might play in the transmission of COVID-19 in health-care[3] and non-health care settings.[4]

Environmental surfaces in health-care settings include furniture and other fixed items inside and outside of patient rooms and bathrooms, such as tables, chairs, walls, light switches and computer peripherals, electronic equipment, sinks, toilets as well as the surfaces of non-critical medical equipment, such as blood pressure cuffs, stethoscopes, wheelchairs and incubators.[5] In non-healthcare settings, environmental surfaces include sinks and toilets, electronics (touch screens and controls), furniture and other fixed items, such as counter tops, stairway rails, floors and walls.

Environmental surfaces are more likely to be contaminated with the COVID-19 virus in health-care settings where certain medical procedures are performed.[6-8] Therefore, these surfaces, especially where patients with COVID-19 are being cared for, must be properly cleaned and disinfected to prevent further transmission. Similarly, this advice applies to alternative settings for isolation of persons with COVID-19 experiencing uncomplicated and mild illness, including households and non-traditional facilities.[9]

Transmission of the COVID-19 virus has been linked to close contact between individuals within closed settings, such as households, health facilities, assisted living and residential institution environments.[10] In addition, community settings buildings, faith-based community centres, markets, transportation, and business settings.[10,11] Although the precise role of fomite transmission and necessity for disinfection practices outside of health-care environments is currently unknown, infection prevention and control principles designed to mitigate the spread of pathogens in health-care settings, including cleaning and disinfection practices, have been adapted in this guidance document so that they can be applied in non-health care setting environments.* In all settings, including those where cleaning and disinfection are not possible on a regular basis due to resource limitations, frequent hand washing and avoiding touching the face should be the primary prevention approaches to reduce any potential transmission associated with surface contamination.[21]

Like other coronaviruses, SARS-CoV-2 is an enveloped virus with a fragile outer lipid envelope that makes it more susceptible to disinfectants compared to non-enveloped viruses such as rotavirus, norovirus and poliovirus.[22] Studies have evaluated the persistence of the COVID-19 virus on different surfaces. One study found that the COVID-19 virus remained viable up to 1 day on cloth and wood, up to 2 days on glass, 4 days on stainless steel and plastic, and up to 7 days on the outer layer of a medical mask.[23] Another study found that the COVID-19 virus survived 4 hours on copper, 24 hours on cardboard and up to 72 hours on plastic and stainless steel.[24] The COVID-19 virus also survives in a wide range of pH values and ambient temperatures but is susceptible to heat and standard disinfection methods.[23] These studies, however, were conducted under laboratory conditions in absence of cleaning and disinfection practices and should be interpreted with caution in the real-world environment.

The purpose of this document is to provide guidance on the cleaning and disinfection of environmental surfaces in the context of COVID-19.

This guidance is intended for health-care professionals, public health professionals and health authorities that are developing and implementing policies and standard operating procedures (SOP) on the cleaning and disinfection of

Best Practices for Environmental Cleaning in Healthcare Facilities: in Resource-Limited Settings Version 2 (cdc.gov)
Cleaning and disinfection of environmental surfaces in the context of COVID-19 (who.int)

Biomedical Waste Management

Bio-Medical Waste Management Rules 2016 Amended 2018 & 2019

- 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
- **Disposal by deep burial permitted only** in rural or remote areas where there is **no access to common bio-medical waste treatment facility**
- Guidelines for handling, treatment and disposal of waste generated during treatment/diagnosis/ quarantine of COVID-19 patient available from central pollution control board- (*Revised in July 2020)*

https://cpcb.nic.in/uploads/Projects/Bio-Medical-Waste/BMW-GUIDELINES-COVID_1.pdf

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

https://cpcb.nic.in/uploads/Projects/Bio-Medical-Waste/Pictorial_guide_covid.pdf
https://cpcb.nic.in/uploads/Projects/Bio-Medical-Waste/BMW-GUIDELINES-COVID_1.pdf

Resources

- National guidelines for IPC in healthcare facilities, MoHFW, GoI, Jan 2020 National Guidelines on Infection Prevention and Control in Healthcare Facilities :: Ministry of Health and Family Welfare (ncdc.gov.in)
- NCDC has posted an updated Hospital preparedness and IPC assessment tool for COVID-19 Infection Prevention and Control for COVID-19, April 2020
- WHO Coronavirus Homepage
- All coronavirus (COVID-19) technical guidance documents
- https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/index.html
- IPC Resources
  - Course Resources | Infection Prevention and Control (IPC) Training Package (ghelearning.org)
  - Country & Technical Guidance - Coronavirus disease (COVID-19)
  - Infection prevention and control: Evidence, guidelines and publications
- Questions and Answers
  - Coronavirus disease (COVID-19) (who.int)
  - Coronavirus (COVID-19) frequently asked questions | CDC

Acknowledgement

- Ministry of Health and Family Welfare, Government of India
- National Centre for Disease Control, New Delhi
- National AMR Surveillance Network Sites- NCDC, New Delhi
- HAI Surveillance Network, JPNATC AIIMS, New Delhi
- Regional Centers, HAI Surveillance Network, AIIMS-ICMR*
- The Tamil Nadu Dr MGR Medical University, Chennai
- Indian Medical Association, Tamil Nadu State Branch
- National Cancer Grid, India
- US Centers for Disease Control
  - India Country Office, New Delhi
  - International Infection Control Program, Atlanta, USA

IPC Capacity Building Regional Sites- HAI Surveillance

1. AIIMS - New Delhi
2. Safdarjung Hospital - New Delhi
3. Hinduja Hospital - Mumbai
4. KGMU - Lucknow
5. PGIMER - Chandigarh
6. Tata Medical Centre - Kolkata
7. Amirtha Institute of Medical Sciences - Cochin
8. KGMU - Lucknow
9. AIIMS - Jodhpur

This work is supported by US Center for Disease Control and Prevention (CDC), India Country office towards hospital preparedness, infection prevention and control (IPC) for COVID-19 for the National AMR surveillance network hospitals coordinated by NCDC, New Delhi.

These FAQs were constructed based on the questions raised during the IPC virtual training by AIIMS- ICMR Healthcare Associated Infection (HAI) Surveillance Network and NCDC –National AMR surveillance network. They are based on the available scientific evidence as of 20 May 2021 in consensus with experts from regional centers for IPC under AIIMS- ICMR HAI surveillance regional centers.

Please note these recommendations might change as more evidence evolves regarding COVID-19.