

Supplementary Table I Various Components of Personal Protective Equipment and Their Use

<i>Type of PPE</i>	<i>Use</i>	<i>Comments</i>
Head cap: 	Covering for hair & scalp which is not readily washable every time Use where aerosol generation /close patient contact	Disposable- SMS* material or hood of Hazmat suit or reusable cloth
Goggles: 	Fitted eye protection, worn over spectacles, avoid when using a face shield Use where aerosol generation /close patient contact	Sanitise with soap solution/ ABR #& reuse
Face shield 	Cover the ear lines on both sides and crown to chin vertically Use where aerosol generation /close patient contact	Disposable ones -transparent sheet on a head ring or sturdy reusable, reliable polycarbonate helmets For intubation goggles preferred Sanitize like the goggles
Shoe covers 	Used in Covid wards	Disposable shoe cover for feet or leggings that go up to the knees.
Surgical Gloves: 	Need not change the gloves after each patient, sanitize adequately between two patients. Discard when any minute cuts or breach on the gloves Use double gloves and discard the outer one after examining suspected patients	Latex or more sturdy and hypoallergic Nitrile ones

Body gowns: 	Recommended when seeing a suspect or proven case. It can be worn as a routine to protect one's clothing. For limited exposure [like routine examination], use a Surgical cloth gown with a disposable plastic sheet over the gown (Like used in HIV set up). Disposable SMS gowns are light, breathable, and comfortable. Innovative Gowns - reusable cloth gowns with plastic layer sewn over the cloth in front 2/3rds and entirely around the sleeves - used for moderate risk of exposure [body fluid splashing expected]. High-risk exposures like while working in COVID19 proven areas or in Operating Theatres must wear Hazmat suits that provide 360-degree protection.	Gowns can be cloth surgical gowns, disposable SMS gowns, or overalls. Aprons - not recommended. Surgical gowns prevent gross contamination of personal clothes are insufficient to prevent infection as they are water-permeable Reusable bodysuits that can be autoclaved or chemically sterilised for a limited number of uses.
Triple-layer pleated surgical mask 	Use genuine brands Masks prevent droplet infection or a splash of fluids. Do not let the mask hanging from the neck. Change mask after 6 hours or as soon as they become wet. Surgical masks, if worn tightly, can show resistance while exhaling, similar to N95 masks. These masks are disposable and are never to be reused. Do not use masks with valves/filters.	Donning- First sanitize hands; unfold the pleats; make sure that they are facing down in front of the mask. Place over nose, mouth, and chin. Fit flexible nose piece over nose bridge and tighten the nose clip adequately. Secure with tie strings, upper string on top of the head above ears, and lower string at the neck's back. Ensure no gaps, adjust to fit. Doffing- remove from behind (without touching the front of the mask). First, untie the string below and then the string above and handle the mask using the upper string. Dispose of in a yellow waste bag. Sanitize hands

Respirators/N95/FFP2 masks: 	These masks fit tightly on the face leading to an effective seal and, hence, efficient for HCW in clinics. They come in a cup shape, D shape, or duckbill shapes. Do not use any respirator mask with an exhalation valve N99, N100, FFP3, P3 reusable respirators filter 99-99.9% of 0.3-micron size particle or larger. These are expensive and are not required except in the high-risk zone like operation theatre.	Use only certified genuine respirators, like certified by NIOSH, USA, or FFP2 \$ approved by the European certifying Committee (CEN). Genuine N95 masks can be identified by having words 'NIOSH certified' and 'TC number' printed on the mask. One can verify the manufacturer from the NIOSH website. Do not touch the N95 mask once worn. If touched, sanitize Never keep the mask hanging below the nose or chin. Use an N95 respirator for a maximum of 8 hours Don't reuse N-95 respirator after accidental contamination with blood or body fluids.
Donning: Sanitize hands. Do not allow facial hair, clothing, or anything else to prevent proper seal between the face and the respirator. Position the respirator in hand with the nose piece at your fingertips. Cup the respirator in your hand, allowing the headbands to hang below your hand. Hold the respirator under your chin with the nosepiece up. While wearing, first wear the lower strap over your neck and then the upper strap over your ears/head. Tighten the straps adequately as required for the leak test. The top strap rests at the top back of your head. The bottom is positioned around the neck and below the ears. Do not crisscross. Leak test: After wearing an N95 mask, do a proper fit and a leak test. Place both hands over the respirator, take a quick breath in to check whether the respirator seals tightly to the face. Place both hands completely over the respirator and exhale. If you feel leakage, there is not a proper seal. If air leaks around the nose, readjust the nosepiece clip. If air leaks at the mask edges, readjust the straps along the sides of your head until a proper seal is achieved. When you inhale sharply after a properly fitting mask, the mask tip should suck in a bit towards your face. Doffing: Sanitize your hands. Remove the lower strap and leave it in front hanging. Next, remove the upper strap and remove the mask without touching the front part of the mask. Hold the mask from the sides where the straps are attached and put it in a paper bag for future use or dispose of in a yellow waste bag.		

*-SMS - Spunbound Meltblown Spunbound, #- ABR – Alcohol Based Rub, \$ FFP Filtering Face Piece

Supplementary Table II Steps and Sequence to Wear an N-95 Mask and PPE

<i>Donning of Mask</i>	<i>Leak test</i>	<i>Doffing of Mask</i>
Sanitize your hands	After wearing the N-95 mask, do a proper fit and a leak test.	Sanitize your hands.
Do not allow facial hair, clothing, or anything else to prevent proper seal between the face and the respirator	Place both hands over the respirator, take a quick breath in to check whether the respirator seals tightly to the face.	Remove the lower strap and leave it in front hanging.
Position the respirator in hand with the nose piece at your fingertips.	Place both hands completely over the respirator and exhale. If you feel leakage, there is not a proper seal.	Next, remove the upper strap and remove the mask without touching the front part of the mask.
Cup the respirator in your hand, allowing the headbands to hang below your hand.	If air leaks around the nose, readjust the nosepiece clip.	Hold the mask from the sides where the straps are attached and put it in a paper bag for future use or dispose of in a yellow waste bag
Hold the respirator under your chin with the nosepiece up.	If air leaks at the mask edges, readjust the straps along the sides of your head until a proper seal is achieved.	
While wearing, first wear the lower strap over your neck and then the upper strap over your ears/head.	When you inhale sharply after a properly fitting mask, the mask tip should suck in a bit towards your face.	
Tighten the straps adequately as required for the leak test. The top strap rests at the top back of your head.		
The bottom is positioned around the neck and below the ears		
Do not crisscross		
PPE Donning Sequence		PPE Doffing Sequence
Hand hygiene		Outer glove
Cap		Gown
Shoe cover		Shoe cover
Hand hygiene		Goggles/ Face shield
Inner glove		Mask
Gown cover all		Cap
Mask [Three ply/N95]		Inner glove
Goggles/Face shield		Hand hygiene

Supplementary Table III Humidification Ventilation and Air Conditioning Modifications for Healthcare Facilities

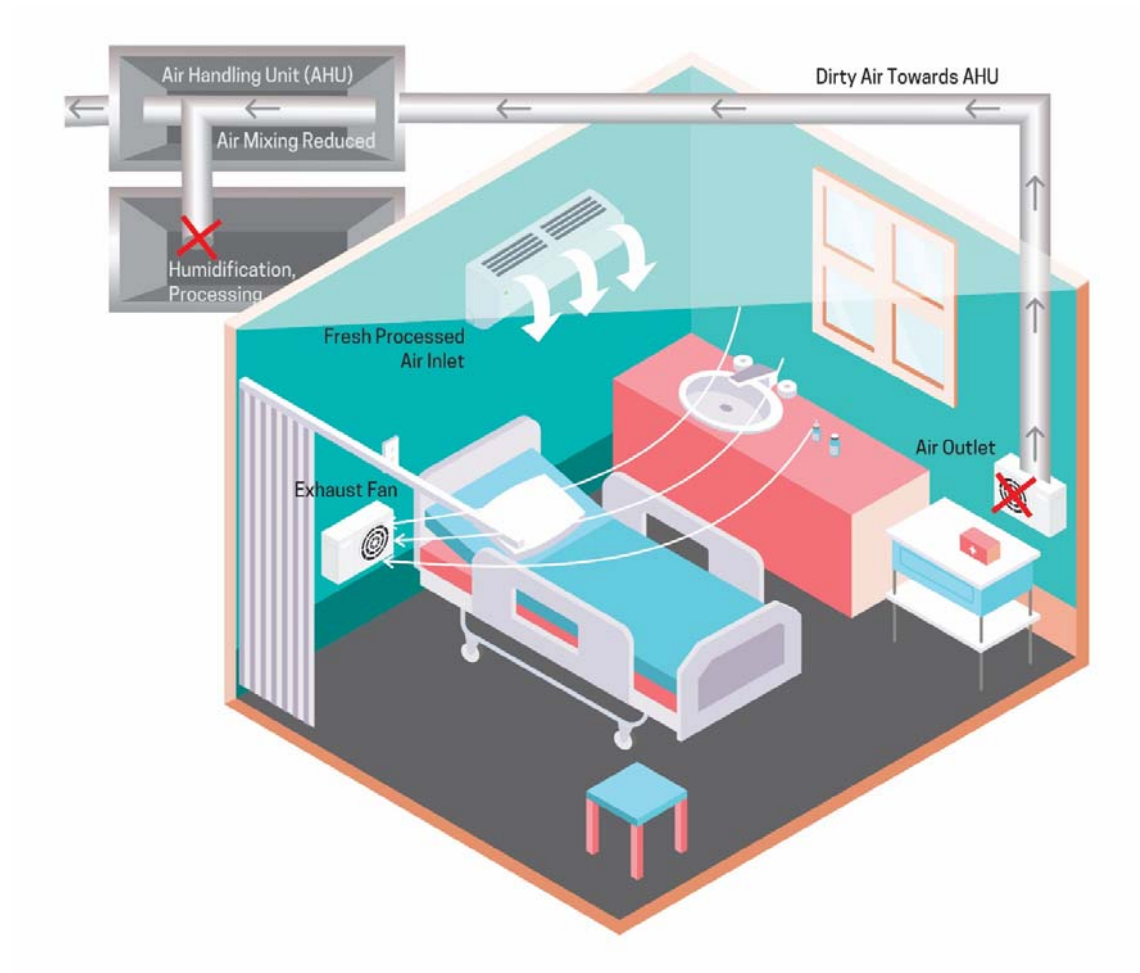
<i>Health Care Facility</i>	<i>HVAC Modification</i>	<i>Remarks</i>
Single room clinics (see figure 2)	1) Install exhaust fan 12 inches above floor towards the patient end with windows sealed.	In case an adjacent washroom is available with an installed exhaust fan, the fan should be switched on; it may require increasing the strength for making it useful.
	2) Air conditioner temperature should be set to provide comfort to occupants. May require increasing the cooling strength or install one more AC	• Draft of air from AC* or cooler should not be directed towards occupants • Air exhaustion can compromise the cooling of the clinic.
	3) If the installation of an exhaust fan not possible, then a medical-grade air purifier can be used	The selection of air purifiers should be based on the size of the room. The HEPA # filter should be a grade of 13 plus or MERV 17 plus. Air Purifier, on its own, is inferior to exhaustion of air.
	4) Droplets based ultraviolet C rays sanitation (cleaning of floor and walls) methods are of limited use. Air sterilization methods require sophisticated equipment with high radiation strength and are expensive	There should be a gap of at least 7 feet between occupants and UVC\$ irradiation. UVC (254 nm wavelength) irradiation with an exposure time of 15 minutes at an irradiation intensity of 4016 $\mu\text{W}/\text{cm}^2$ resulted in complete inactivation of SARS-CoV ‡
2) Clinic without facilities of air cooler, air conditioners, exhaust fan.	Improve cross-ventilation by opening doors and windows.	Opening windows and doors increases air exchange per hour to more than 8. However, it compromises the quality of air and can lead to thermal stress Difficult to tolerate PPE ^ in uncontrolled temperature
3) Polyclinic – Multiple rooms	Placement of PVC** ducts with exhaust fans (see figure 3)	Air should be exhausted safely. Care to be taken not to exhaust air to other occupied areas.
4) Conversion of an emergency room in the isolation	Natural ventilation – open door and windows – permit cross ventilation	Air temperature should be monitored to avoid thermal stress.
	Anteroom available – Place exhaust fan in the washroom and convert	

room	anteroom to the positive pressure room	
	Anteroom not available – Place inline exhaust fan (figure 7)	
5) Conversion of ICU in the temporary isolation room. (figure 5,6,7)	1) Placement of PVC ducts with exhaust fans (see figure 3). PVC ducts should be placed above the false ceiling, and all inlets which transfer the air from contaminated area to the air handling unit should be sealed. AHU## should be provided fresh air as much as technically possible. 2) Place HEPA based air purifier (figure 4)	1) Decontaminate air by applying HEPA filter or exhaust 3 meters above the highest point of the building 2) Intake of HEPA filter should be from fresh source as well as air should be exhausted out of room to prevent recirculation 3) Room doors and windows should be sealed for 5 PSI negative pressure to be created. 4) Minimum of 12 air exchanges to be produced 4) Use Maghelic pressure gauze or Smoke/tissue to ascertain effective negative pressure.
Exhaust fan capacity selection	As per the size and air exchanges required	CFM \$\$ = $\frac{\text{Volume of the room} \times \text{Air changes desired}}{60 \text{ (Minutes)}}$
Selection of HEPA filters	1) Medical grade 2) HEPA 13 plus (Particle size less than 0.3 microns) clearance by 99.7 efficiency or MERV value 17 plus (Hyper HEPA filters)	The HEPA filter on its own is not effective in preventing spread, prevention of recirculation of the contaminated air
Example - Calculation of air exchange per hour for selecting air purifier based on HEPA filter Room Volume= 15X15X8.5 =1913 cubic feet 150 CFM X 60 minutes /1913 Cf = approx. 5 ACH		

*AC – Air Conditioner, # HEPA- High Efficiency Particulate Air, \$ UVC – Ultra Violet C rays, † SARS-CoV – Severe Acute Respiratory Syndrome Corona Virus 2, ^ PPE – Personal Protective Equipment, **PVC – Polyvinyl Chloride, ## AHU Air Handling Unit, \$\$ CFM – Cubic Feet per Minute, #ACH Air Exchanges per Hour



Supplementary Fig. 1 Minimising risk of transmission- All wear masks, HCW with goggles-PPE, Exhaust ventilation-aerosols exhausted, droplets on various surfaces and AC directed from clean to contaminated.



Supplementary Fig. 2 Conversion of existing ICU to isolation room. Air duct containing dirty air should be blocked. Air Handling Unit [AHU] should provide fresh gas as much as possible. Install a negative pressure exhaust system.



Supplementary Fig. 3. In figure a there is no exhaust fan and occupants of chair face will be directed towards each other whereas in picture b is chair are arranged facing wall and exhaust fan has been installed