

**All India Institute of Medical Sciences
New Delhi**

Guidelines for Re-Use of Personal Protective Equipment

Note: This is a dynamic document and shall be modified according to latest recommendations and scientific evidence.

PREAMBLE

The COVID-19 pandemic has strained our resources tremendously in the healthcare setting. One of the most urgent issues is the fast depletion of personal protective equipment (PPE) used in the care of patients. This is a significant concern for healthcare workers' health and safety. Many countries have already exhausted or soon will exhaust their stockpile of PPE. This is despite adopting PPE sparing practices as the number of COVID-19 cases in the affected countries increases at an exponential rate and manufacturers struggle to keep up with the worldwide demand.¹⁻⁴ Existing CDC guidelines⁵ recommend a combination of approaches to conserve supplies while safeguarding health care workers in such circumstances including minimizing the number of individuals who need to use respiratory protection, implementing practices allowing extended use and/or limited reuse of N95 respirators etc.

Decontamination and reuse of PPEs may provide another solution by extending existing on-hand supplies. Currently, decontamination of PPEs for purposes of reuse is not recommended, primarily because of concerns that decontamination would degrade the performance especially of the respirator. Preliminary work on the decontamination of N95 masks has been published in recent years.⁶⁻¹¹ However, given the uncertainties on the impact of decontamination on respirator performance, these should not be worn by HCWs when performing or present for an aerosol-generating procedure.

The methods available for disinfection are only considered as extraordinary last-resort methods in the event of imminent shortages of PPE. They should only be applied after a careful evaluation of the situation and after exploring the possibility of resource-conscious, rational PPE use, for example by extending a respirator's lifespan beyond its normal limits. These guidelines have been adapted according to the local scenario and materials available.

Protocol For Decontamination of Coveralls and N95 Respirators⁶⁻⁸

Segregation: Used coveralls [manufactured by Dupont (Tyvek- white/ Tychem- Grey color) **OR** by Kimberly Clark (A30- white color)] and N95 respirators (all types) should be deposited into separate clearly labelled **RED** bins with **RED double bags**.

Note: Used coveralls should be kept in closed bins/sealed bags in separate locked room until they are collected for reprocessing and decontamination.

Requirements:

- Minimum two designated adjoining rooms (one decontamination room for actual decontamination process & one processing room with clean areas for packing and dispatching decontaminated coverall).
- Hydrogen Peroxide Vapour (HPV) generator + clothes-clips (plastic/wooden)+ clothes-lines/ curtain lines with hooks (for N95)
- 11% commercially available stabilized Hydrogen Peroxide (e.g. Baccishield or Ecoshield in hospital supply)
- Measurement cylinders
- Closed bins/large plastic bags
- Stool/chair for standing while clipping the coveralls
- Permanent markers.
- Sealing machine with plastic pack rolls.
- PPE requirement for the processing staff [gown, N95 masks, nitrile gloves, heavy duty gloves, goggles, face shield, long boots, sterilium). The staff involved in this should be on hydroxychloroquine prophylaxis.
- Logbooks

Working solution: Make doubling dilution of 11% Hydrogen Peroxide according to volume of the room (see table).

Choose cycle/running time depending on the volume of the room as indicated below:.

Room Volume	Hydrogen Peroxide (11%) in ml	RO water in ml	Final volume	Cycle/Running time at 32 ml /min in SATEJ PLUS machine
1000 cu ft	100 ml	100 ml	200 ml	6 min
2000 cu ft	200 ml	200 ml	400 ml	12 min
3000 cu ft	300 ml	300 ml	600 ml	19min
4000 cu ft	400 ml	400 ml	800 ml	25min
5000 cu ft	500 ml	500 ml	1000 ml	31min
6000 cu ft	600 ml	600 ml	1200 ml	37min

Procedure:

Have the clothes line placed at a height of around 7 ft. Keep a gap of 3ft between each line.

- Seal entire room (including AC vents), except the door, using brown tape.
 - Clip coveralls to clothes-lines suspended at each shoulder or hand using hangers. Ensure that the zip is open to expose the inner part. Keep a gap of at least 1 foot between each coverall.
 - N95 masks can be clipped by the elastic band/ or hung on hooks on the clothes line with a gap of half foot between each mask.
 - Ensure that HPV generator is plugged in and in position (45 degree angle), and there are no obstructions between HPV generator and suspended coveralls.
 - Exit decontamination room and doff the gloves and gown at threshold. Discard in red bin. Perform hand hygiene.
 - Start the HPV generator cycle.
 - Let the room be sealed for at least 2 hrs after the cycle finishes.
 - This completes the decontamination cycle.
 - Open door- you will see fog; check the machine container to confirm that the solution was used. Aerate by switching on ceiling fans for 4 hours.
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- After completion of decontamination cycle, collect decontaminated PPE in a clean container. The staff should don fresh PPE again.
 - The collected PPE should then be moved to the adjacent room.
 - The coveralls should be folded properly and packed in plastic bags
 - The N95 masks should be placed in a separate box and sealed—NEED to work this out as there are different types.
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Note: Biological indicator containing *Geobacillus stearothermophilus* spores may be used weekly, in separate locations inside the room, for quality control purpose.

Protocol for Re-use of Face shields and Goggles:

Segregation: Used face shields/goggles should each be deposited into separate clearly labelled **RED** bins/bags.

Equipment and materials required: 0.5% sodium hypochlorite- freshly prepared (see annexure); 70% alcohol (Bacillol solution), red buckets , flat surface for drying, clean pads/wipes.

Procedure¹²:

- Immerse face shields and goggles in buckets of freshly prepared (not more than 4 hrs old) 0.5 % sodium hypochlorite solution for 10 minutes.
- Take out the face shields/goggles from the bin.
- Dry on a flat surface.
- Only after the surface is completely dry, wipe all surfaces with 70% alcohol using a clean pad/wipes.
- Face shields/goggles can be used once dry.
- Place these in a new clean container.

- **PPE for re-processing staff** (gown, N95 masks, nitrile gloves, heavy duty long gloves, goggles, face shield, long boots, alcohol based hand rub). The staff involved in this should be on hydroxychloroquine prophylaxis.
- Log book

Annexure:

SOP to make 0.5% hypochlorite

- I. Procedure when 10% Sod. Hypochlorite solution is in hospital supply:**
 - a. One part (1) of sodium hypochlorite solution in nineteen (19) parts of water.

- II. Procedure when 4% Sod. Hypochlorite solution is in hospital supply:**
 - a. One part (1) of sodium hypochlorite solution in seven (7) parts of water.

Change solution after every four hours. Emptying of bin containing sodium hypochlorite to be done in the sluice room. ICNs in each area should help to standardise the protocol.

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