

# **Use of Personal Protective Equipment**

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## 1. Introduction

- 1.1. The primary use of personal protective equipment (PPE) is to protect healthcare workers (HCWs) and reduce opportunities for transmission of microorganisms in healthcare facilities. It does not reduce the level of hazard itself nor guarantee total protection. They should be used as the supplement to the administration and engineering control in the care of the infective patients.
- 1.2. Care should be taken in both putting on clean PPE properly and timely removal of contaminated PPE without contamination of the staff themselves and the environment.
- 1.3. PPE should be removed immediately after use or whenever grossly contaminated (1,2). The contaminated area of PPE should be minimally touched as far as possible. The most contaminated equipment should be removed first, usually the gloves and gowns (1,2), and then the less contaminated device. Hand hygiene should be performed after gloves removal, during and after PPE removal procedure.
- 1.4. There is different PPE for infection control purpose, including gloves, gowns/ aprons, mask and respirator, eye protection, cap and footwear.

## 2. Gloves

- 2.1. Do not wear gloves routinely and indiscriminately as it gives worker a false sense of security leading to decrease in hand hygiene frequency (3).
- 2.2. Wear gloves if in contact with blood, body fluids, secretion s, excretions, mucous membrane and non-intact skin, or items that are contaminated by these materials (3), or contact with a patient (and his/her immediate surroundings) during contact precautions (3,4).
- 2.3. Medical gloves should be selected appropriate to job task, patient-care activities and hand size. Powdered medical gloves should not be used because these products present additional or increased risk including inflammation, granulomas, and respiratory allergic reactions (3).
- 2.4. Change gloves between patients or between procedures performed on dirty and clean body sites in the same patient (3).
- 2.5. Medical gloves should be discarded immediately after removal. Gloves should not be washed, decontaminated, or reprocessed for any reuse purpose. Disinfection of gloved hands with ABHR is not recommended (3).

- 2.6. The use of gloves does not replace the need for hand hygiene (3).
- 2.7. Steps of wearing [\(Figure 1\)](#) and removing gloves [\(Figure 2\)](#) (5):

### **3. Gowns/ Aprons**

- 3.1. Do not use gown routinely.
- 3.2. Wear gowns when:
  - 3.2.1. Anticipating contamination by blood, body fluid, secretion or excretion during procedure to protect the skin and working clothes of the healthcare workers (1,2).
  - 3.2.2. having substantial contact, for examples, bathing, position turning with patients under contact precautions (4).
- 3.3. Select gowns according to the amount of fluid encountered to ensure adequate protection (1,2).
- 3.4. The gown should be long enough to cover the front and back of the wearer, from the neck to mid-thigh, and the sleeves no shorter than just above the wrist. The cuffs of the gown should be covered by gloves. (6)
- 3.5. Steps of wearing [\(Figure 3\)](#) and removing gown [\(Figure 4\)](#). (5)
- 3.6. Aprons may be used as an alternative, when its protection is sufficient. (2)

### **4. Respiratory Protection**

- 4.1. Surgical mask
  - 4.1.1. Wear a surgical mask when blood, body fluid, secretion or excretion splashing procedure is anticipated and when approaching within one metre of patients on droplet precaution (1,2,4).
  - 4.1.2. Surgical Masks should not be shared or reused (7).
  - 4.1.3. Steps of wearing [\(Figure 5\)](#) and removing [\(Figure 6\)](#) surgical mask. (5)
- 4.2. Particulate respirator
  - 4.2.1. Use particulate respirator, for example, N95 and FFP2 respirators for Airborne Precautions which can filter out the airborne contaminants (1,2,4).
  - 4.2.2. Surgical N95 respirators have been tested for fluid resistance and flammability and are commonly used in healthcare settings (7).
  - 4.2.3. Do not use respirator with exhalation valve / vent for infection control purposes.

- 4.2.4. Staff should utilize appropriate procedure to select the appropriate respirator size and type that fits well to ensure adequate protection. The respirator wearer needs to perform the seal-check before each entry into the airborne isolation areas (1,2).
- 4.2.5. Wear respirator according to the manufacturers' recommendation.
- 4.2.6. Method of removal should be adhered to in accordance to the manufacturer's recommendation. In general, the staff should not touch the front of the respirator as it is considered to be contaminated after used, and should perform hand hygiene afterwards. [Figure 7](#) is the recommended non-touch removal method for a cup-shape respirator if manufacturer's recommendation is not available.

## 5. Eye Protection

- 5.1. Eye protection is necessary when splashing of blood, body fluid, secretion or excretion is likely (1,2).
- 5.2. It should be comfortable and allow for sufficient peripheral vision (8). Appropriately fitted, indirectly-vented or non-vented goggles with anti-fog coating are preferred for infection control purpose. Goggles must fit snugly, particularly from the corners of the eye across the brow ([Figure 8](#)). While highly effective as eye protection, goggles do not provide splash or spray protection to other parts of the face (8).
- 5.3. To provide further protection to other facial areas, use face shields as alternative to goggles. A face shield should have crown and chin protection and wrap around the face to the point of the ear, which reduces the likelihood that a splash could go around the edge of the shield and reach the eyes. Disposable face shields with light weight films attaching to a surgical mask or fit loosely around the face should not be relied upon as optimal protection (8).
- 5.4. Personal eyeglasses and contact lenses are not considered adequate eye protection (8).
- 5.5. Steps of removing eye protection ([Figure 9](#)) (5)

## 6. Cap

- 6.1. Use a disposable cap of an appropriate size which completely covers the hair when splashes of blood and body fluids are expected (9).
- 6.2. Removal of a cap: Lift the cap upwards and backwards, avoid touching the clothes, discard it and then perform hand hygiene.

## 7. Footwear

- 7.1. Use boots when gross foot contamination by blood or body fluid is anticipated (10), for examples, during the orthopaedic surgery (11).

## 8. Doffing PPE

- 8.1. Careful doffing is crucial in avoiding contamination. Do not doff together in close proximity to another person.
- 8.2. Doff PPE in a manner that prevents self-contamination or self-inoculation with contaminated PPE or hands.
- 8.3. Doff PPE either in the anteroom or if there is no anteroom make sure that neither the environment outside the isolation room/ area nor other persons can get contaminated.
- 8.4. Suggested sequence of doffing PPE:
  1. Remove gloves
  2. Perform hand hygiene
  3. Remove gown
  4. Perform hand hygiene
  5. Remove disposable cap and eye protection
  6. Perform hand hygiene (optional)
  7. Remove mask/ respirator
  8. Perform hand hygiene

### Rationale:

- Keep mucosal protection intact throughout

*(Footnote: The sequence may vary slightly according to local practice without jeopardising the general infection control principles.)*

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**Figure 1: Steps of Wearing Gloves**

1. Gloves should be donned the last after other PPE when indicated.
2. Gloves should completely cover the cuffs of the gown.



**Figure 2: Steps of Gloves Removal**

1. Grasp outside of glove with opposite gloved hand and then peel off.
2. Hold removed glove in gloved hand.
3. Slide fingers of ungloved hand under remaining glove at wrist.
4. Peel glove off over first glove.
5. Discard gloves in a lidded rubbish bin.
6. Perform hand hygiene.



**Figure 3: Steps of Wearing Gown**

1. Fully cover torso from neck to knees, arms to end of wrist, and wrap around the back.
2. Fasten the tie or velcro tab at the back of neck, then fasten the ties at one side of the waist.



**Figure 4: Steps of Gown Removal**

1. Untie at the waist, then untie or detach the velcro tab at the neck.
2. Pull away from neck and shoulders.
3. Keep arm straight when removing the sleeves. Pull out the arm slowly. Then remove the other sleeve.
4. Keep the gown away from body. Do not touch the outer surface of the gown. Roll it inside out in a bundle.
5. Discard into a lidded rubbish bin.
6. Perform hand hygiene.



**Figure 5: Steps of Wearing Surgical Mask**

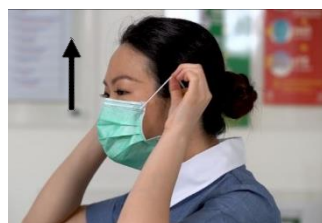
1. Position the elastic bands around both ears.
2. Mould the metallic strip over the nose bridge.
3. Extend the surgical mask to fully cover the mouth, nose and chin.



**Figure 6: Steps of Mask Removal**

**Tie-on type:**

1. Unfasten the lower ties with clean hand, and then the upper ties.
2. Discard the mask into a lidded rubbish bin.
3. Perform hand hygiene.



**Ear-loop type:**

1. Lift both elastic bands.
2. Remove and discard the mask into a lidded rubbish bin.
3. Perform hand hygiene afterwards.





**Figure 7: Steps of Respirator Removal by Non-Touch Technique**

1. Grasp bottom ties of the respirator, then the ones at the top, and remove without touching the front.
2. Discard the respirator into a lidded rubbish bin.
3. Perform hand hygiene.



**Figure 8: Steps of Wearing Eye Protection**

1. Remove the protection film if any.
2. Hold the rubber band on both sides then put on the face shield.
3. Face shield should cover from forehead to chin and lateral sides of face.



Goggles



Face shield

**Figure 9: Steps of Protective Eyewear Removal**  
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1. Avoid touching the outer surface of face shield by holding only the strap. Lean the body slightly forward and remove the face shield in a forward direction.
2. Discard or decontaminate according to local policy. Perform hand hygiene afterwards.



Goggles



Face shield

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