Office of the
Provincial Health Officer

Recommendations for Donning (putting on) and Doffing (taking off) Personal Protective Equipment for Health Care Workers during the Management of Persons Under Investigation or Confirmed Cases of Ebola Virus Disease

Lower Transmission Risk Scenario

Provincial Ebola Expert Working Group
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This document provides expert guidance to those:

- using personal protective equipment (PPE) while providing care for patients who are being investigated or treated for Ebola virus disease (EVD).
- training health care workers on the use of personal protective equipment (PPE).

This document deals specifically with the necessary PPE for use in lower transmission risk scenarios, defined as:

> Caring for patients under investigation (PUI, defined as anyone with a potential exposure to Ebola virus, any symptoms compatible with EVD, and laboratory result pending) or with confirmed EVD where diarrhea and vomiting are absent or minimal and patient body fluids are contained (usually in the early stage or convalescing stage of EVD).

This document details what PPE a health care worker should wear when providing care in a lower transmission risk scenario, and how to put on (don) and take off (doff) PPE safely. It also details administrative and environmental considerations for preventing transmission. A companion document provides recommendations for higher transmission risk scenarios. An expert advisory team is available 24/7 for guidance in assessing transmission risk, and should be consulted if in doubt.

A. Preamble

While the probability of Ebola virus disease (EVD) in British Columbia is low, it is essential that health care workers are prepared to safely and effectively care for patients. Preparedness relies on clear algorithms and clinical process, appropriate personal protective equipment supply and deployment, and appropriate training for staff in the processes and equipment.

This guidance has been developed by infection control experts from across B.C. through the Expert Clinical Working Group under B.C.'s Provincial Ebola Taskforce. Guidance is aligned with the recommendations of the B.C. Provincial Health Officer, the Public Health Agency of Canada, and the US Centers for Disease Control and Prevention.

B. Guiding Principles

1. Along with the safety and care of patients, health care worker safety is of paramount importance.
2. To prevent the transmission of infection, personal protective equipment (PPE) represents one type of control, along with administrative controls and environmental/engineering controls. Each type of control is equally important and must act as complementary parts in a system.
3. To reduce the risk of infection, health care workers working with confirmed or suspected EVD patients should have no skin exposed.

These recommendations were developed based on evidence and best practices from other organizations and jurisdictions (World Health Organization, Centers for Disease Control and Prevention, and from communication with Emory Hospital, Atlanta, Georgia):

1. Ebola is spread through direct contact (via broken skin or mucous membranes) with the blood / body fluids of someone with Ebola, or with items contaminated with blood/body fluids containing Ebola. Every effort should be made to avoid direct contact with infectious materials.
2. Disposable PPE should be used. In cases where disposable materials are not available, equipment should be cleaned in compliance with the manufacturer's recommendation or discarded after one use.
3. Prior to patient care of confirmed or suspected EVD patients, health care workers must be trained in infection control procedures, including specific EVD-related donning/doffing procedures.
4. Donning and doffing PPE should be performed in a designated area, and always under the direction of a trained observer. A doffing assistant may be used if required.
5. When doffing PPE, the most contaminated equipment should be removed first, working towards the least contaminated.
6. PPE should not be adjusted during patient care. If any breach in PPE occurs during patient care, the health care worker should move to the doffing area to investigate the breach, and follow the institutional exposure process.
7. If PPE become grossly contaminated during the provision of care, the health care worker should exit the room, follow the correct PPE doffing procedure and don clean PPE before continuing care.
8. The highest risk of exposures exists while doffing the PPE, particularly around the mucous membranes of the face. Health care workers should remove the PPE slowly and follow the guidance of the trained observer. If a doffing assistant is required, they must have donned appropriate PPE prior to assisting.

C. Recommended Administrative and Environmental/ Engineering Controls to Support Safe PPE Use

1. **Administrative Controls**

   a. Designate personnel responsible for the implementation of personal protective equipment (PPE) protocols and training in each care area.

      i. Interim protocols and recommendations should be developed and regularly reviewed to reflect evolving knowledge and understanding.
      ii. Health care workers should be trained in appropriate institutional infection control protocols, including but not limited to, PPE donning/doffing prior to caring for suspected patients.
      iii. Health care worker training must be documented.
      iv. A trained observer with a checklist to guide the health care worker through the donning and doffing process is required.

   b. Staff Working with Suspect or Confirmed EVD Patients

      i. Increase staffing will be required to meet the anticipated increase in workload.
      ii. Health care workers entering the room must be kept to an absolute minimum. Students, medical care teams and other personnel not essential to that patient's care must not enter the room. Repeated physical exams by medical staff are discouraged unless clinically warranted. One physician should examine the patient while the rest of the medical team remains outside the room. More information can be found in the Recommended Staffing for EVD Patients document on the Provincial Health Officer's Ebola website at: www.health.gov.bc.ca/pho/physician-resources-ebola.html .
      iii. Health care workers caring for persons under investigation or confirmed EVD cases should self-monitor for symptoms on a daily basis with direction from public health and workplace health. If caring for someone where EVD is subsequently ruled out, continued monitoring is no longer necessary.
      iv. Health care workers caring for persons under investigation or confirmed EVD are to sign in on the PATIENT CONTACT LIST daily.

   c. Triage, Assessment and Disposition

      i. There should be an algorithm for screening patients and immediately managing a person under investigation or confirmed EVD. This algorithm will be finalized and posted on the Provincial Health Officer's Ebola website at: www.health.gov.bc.ca/pho/physician-resources-ebola.html.
      ii. An assessment of risk should be performed when evaluating the level of preventive measures required for a given clinical situation in a given care area.

2. Environmental/Engineering Controls

a. Patient Rooms and Antechambers

i. Ideally a person under investigation or confirmed EVD patient should be assessed and managed in a designated isolation room with a dedicated washroom.
   - A negative pressure room with an antechamber is preferred, but may not be feasible given institutional infrastructure. If this is not available, they may be cared for in a room with the door closed.
   - Ideally the isolation room should be equipped with an intercom.
   - Ideally the isolation room should have large observation windows.

ii. Facilities maintenance and operations should assess HVAC systems in areas that may care for persons under investigation or confirmed EVD patients. Air exchanges should be adjusted to their optimal level.

iii. There should be designated donning and doffing areas. These areas may vary based on institutional infrastructure.

iv. Ideally, designated donning areas should be different than designated doffing areas.

D. Recommended Personal Protective Equipment (PPE)

The recommended PPE for low transmission risk care is:

1. Scrubs (disposable if available, non-disposable scrubs will be discarded).
2. Fluid-impervious footwear (closed toe and heels).
3. Fluid-resistant surgical hood (that covers the neck) should be worn in combination with a bouffant surgical cap.
4. Full face-shield.
5. Procedure (surgical) mask (N95 respirators are not the recommended standard, but may be used by the health care worker). If aerosol generating medical procedures are anticipated, a fit-tested N95 respirator **must** be worn.
6. Fluid-resistant gown.
7. Two pairs of long nitrile gloves (chemical resistant). The outer gloves should be larger than the inner gloves to facilitate double gloving.
8. Fluid-impervious foot coverings with fluid-resistant leg coverings should be worn.
9. Additional supplies:
   a. Alcohol-based hand rub.
   b. Disinfectant wipes (bleach, accelerated hydrogen peroxide or hospital grade disinfectant).
   c. Absorbent mats in doffing area.

PPE standards for lower transmission risk have been shown to be highly effective (CDC, 2014). This PPE is most familiar and safest for health care workers, and provides the protection needed (CDC 2014). For the higher transmission risk PPE, two options have been recommended, and are covered in a companion document

E. Recommended Donning (putting on) Procedure for PPE

In designated PPE donning area:

1. Ensure trained observer is engaged and guiding the donning procedure.
2. Remove personal clothing and all personal items. Eyeglasses may be worn.
3. Perform hand hygiene with alcohol-based hand rub.
4. Securely tie back hair if required.
5. Change into hospital scrubs.
6. Put on fluid-impervious footwear.
7. Perform hand hygiene with alcohol-based hand rub.
8. Inspect PPE prior to donning. Replace PPE if defects found.
9. Put on knee-high leg and foot coverings.
10. Put on a fluid-resistant long sleeved disposable gown of sufficient length to reach mid-calf.
11. Put on procedure mask. If an aerosol generating medical procedure is anticipated, an N95 respirator should be donned (see below).
12. Put on fluid-resistant hood covering, ensuring hair, ears and neck are covered. If fluid impervious head covering not available, put on fluid-resistant surgical hood over top of bouffant surgical cap.
13. Perform seal check if using N95 respirator.
14. Put on full face-shield.
15. Put on a pair of long inner gloves. Ensure that the inner gloves are under the cuff of the gown sleeve.
16. Put on a pair of long outer gloves. Pull the glove completely over the cuff of the gown sleeve.
17. You and the trained observer must agree that the PPE is on correctly, with no gaps that expose skin or mucous membranes.

Note on Aerosol Generating Medical Procedures (AGMP)

Aerosol generating medical procedures pose a separate risk from the risk of EVD from exposure to blood or body fluids because of the risk of production of aerosols which may be inhaled. For AGMPs in lower transmission risk patients, a fit tested N95 respirator should be worn, in addition to the regular lower transmission risk PPE.

In addition, the following principles should be used for AGMPs.

- AGMPs should be avoided on patients suspected or confirmed to have EVD.
- If AGMPs are absolutely necessary (e.g., endotracheal intubation), implement strategies to reduce aerosol generation. These include:
  - AGMPs should be anticipated and planned for.
  - Appropriate patient sedation should be used.
  - The number of health care workers in the room should be limited to those required to perform the AGMP and those highly skilled in performing the required task.
  - AGMPs should be performed in an airborne infection isolation room (also referred to as a negative pressure room).
  - Appropriate ventilation (e.g., number of air changes, level of air filtration and correct direction of air flow) should be maintained.
  - Single rooms (with the door closed and away from other patients) should be used in settings where airborne infection isolation rooms are unavailable.
  - Fit tested, seal checked respirators (NIOSH approved N95 at minimum) should be worn by all health care workers in the room during an AGMP.
  - Closed endotracheal suction systems should be used wherever possible.

F. Recommended Doffing (taking off) Procedure for PPE

Recommended PPE for Doffing Assistants:

The trained observer should not enter the room of a patient with EVD, but will be in the PPE removal area to observe the removal of PPE. If the health care worker exiting the room requires assistance in the doffing process, the person providing assistance should don the following PPE:

1. Fluid-impervious gown.
2. Two pairs of long nitrile gloves (chemical resistant).
3. Procedure mask.
4. Full face-shield.
5. Fluid-impervious foot coverings.

The assistant should doff selected PPE according to the same procedures outlined below. If doffing assistance is provided, then the assistant should disinfect their outer gloves with a disinfectant wipe or alcohol-based hand rub prior to doffing their PPE.

Recommended PPE Doffing Procedures:

In patient room:

1. Signal to trained observer that you are ready to exit the patient room.
2. Only one person shall exit the patient room at a time. PPE must be removed completely in the anteroom or designated area before the next person removes their equipment.
3. Disinfect gloved hands with disinfectant wipe or alcohol-based hand rub and allow to dry.
4. Disinfect door handle with a new disinfectant wipe and exit the patient room.

In the designated PPE removal area:

1. Ensure trained observer is engaged and guiding the doffing procedure.
2. If assistance is required in doffing PPE, the person providing assistance should be wearing appropriate PPE.
3. Removal of PPE must be performed in a defined PPE removal area (e.g., anteroom, designated space).
4. All PPE waste must be placed carefully in the designated infectious waste container.
5. Walk onto disposable absorbent mat.
6. Inspect the outer gloves' outer surfaces for visible contamination, cuts or tears. Disinfect outer gloved hands with disinfectant wipe or alcohol-based hand rub and allow to dry.
7. Outer Gloves: Disinfect outer-gloved hands with a disinfectant wipe or ABHR and wait for 1 minute. Remove and discard outer gloves, taking care not to contaminate inner glove during removal process.
8. Inspect the inner gloves' outer surfaces for visible contamination, cuts or tears.
    a. If an inner glove is visibly soiled, cut or torn, remove the inner gloves and wash hands well with soap and water on bare hands, and don a clean pair of gloves. **This is a breach.**
    b. If no visible contamination, cuts or tears are identified on the inner gloves, disinfect the inner-gloved hands with a disinfectant wipe and wait one minute.
9. Remove knee-high leg and foot coverings while sitting down on designated stool. Place leg and foot coverings in infectious waste container.
10. Disinfect inner gloved hands with disinfectant wipe or alcohol-based hand rub and allow to dry.
11. Remove the face shield by tilting your head slightly forward and pulling it over the head using the rear strap. Allow the face shield to fall forward and discard in infectious waste container.
12. Disinfect inner gloved hands with disinfectant wipe or alcohol-based hand rub and allow to dry.

13. Remove head covering. Carefully grasp outer surface of hood behind head and gently roll-up hood. Tilt head forward, close eyes and remove hood by pulling towards front of face. Place in infectious waste container.
14. Disinfect inner gloved hands with disinfectant wipe or alcohol-based hand rub and allow to dry.
15. Untie side strap of gown. Do not reach behind neck to release the Velcro neck snap. Remove gown by pulling away from the body, rolling inside out being careful to avoid contaminating inner clothing. Place in infectious waste container.
16. Remove inner gloves and dispose in infectious waste container.
17. Carefully perform hand hygiene with alcohol-based hand rub.
18. Put on a pair of new gloves.
19. Remove procedure mask OR N95 respirator by straps. Do not touch the front of the procedure mask/N95 respirator. Discard in the infectious waste container.
20. Disinfect shoes (with disinfectant wipes) while sitting on designated stool.
21. Disinfect gloves with disinfectant wipe or alcohol-based hand rub and allow to dry.
22. Disinfect designated stool with disinfectant wipes.
23. Roll absorbent mat and discard in infectious waste container.
24. Remove gloves and discard in infectious waste container.
25. Carefully perform hand hygiene with alcohol-based hand rub or clean sink.
26. If personal eyeglasses were worn into the room, disinfect with a disinfectant wipe.
27. Perform a final inspection for any indication of contamination of the hospital scrubs or otherwise on the body.
28. Exit doffing area.

G. Procedure for Suspected Breach in PPE

1. If a breach in PPE is suspected and there has been exposure to a patient’s body fluids, go to designated doffing area immediately. **Remain calm and work slowly through each step outlined in this document.**
2. Work with trained observer to remove PPE as per the step-by-step instructions above for doffing PPE, taking care to avoid any further self-contamination.
3. If exposed area is intact skin, wash the affected area well with soap and water.
4. If exposed area is a mucous membrane or eye, flush the area with generous amounts of water.
5. If a percutaneous injury occurs, do not promote bleeding by squeezing the wound and do not soak the wound in bleach or disinfectant. Wash the area with soap and water.
6. Immediately follow your health authority protocol for reporting exposure.
   Note: In most regions, report the exposure immediately by calling workplace health. If it is after hours, call the medical health officer on call to report the breach and receive further instructions.

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