



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), and
- ▶ 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 a person with EVD-compatible symptoms not attributed to another medical condition **AND** a potential exposure to Ebola virus in the 21 days prior to symptoms onset) or confirmed EVD patients, 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. This team is available through the local medical health officer.

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 (PPE) 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 of an infection control response.
3. To reduce the risk of infection, health care workers working with persons under investigation (PUI) or confirmed 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 PUI or confirmed 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 PPE protocols and training in each care area.
 - i. 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 PUI or confirmed EVD 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 PUI or Confirmed EVD Patients
 - i. Increased 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. See the Provincial Health Officer's Ebola website at: <http://www2.gov.bc.ca/gov/content/health/about-bc-s-health-care-system/office-of-the-provincial-health-officer/current-health-topics/ebola>.
 - iii. Health care workers caring for PUI 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 authorities/hospitals must keep a daily record of all health care workers who enter the room of a PUI or confirmed EVD patient, or have any contact with waste generated by these patients.
- c. Triage, Assessment and Disposition
 - i. An algorithm for screening patients and immediately managing a PUI or confirmed EVD is available on the Provincial Health Officer's Ebola website at: <http://www2.gov.bc.ca/gov/content/health/about-bc-s-health-care-system/office-of-the-provincial-health-officer/current-health-topics/ebola>.
 - 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. Designate an isolation room with the following features for the assessment and management of PUI or confirmed EVD patients. It may not be feasible to have all of these features given institutional infrastructure.
 - ▶ A dedicated washroom is essential given the mode of transmission of Ebola.
 - ▶ A negative pressure room with an antechamber is preferred. If not available, provide care in a room with the door closed.
 - ▶ An intercom is ideal.
- ii. Large observation windows are ideal.
- iii. Facilities Maintenance and Operations should assess HVAC systems in areas that may care for PUI or confirmed EVD patients. Air exchanges should be adjusted to their optimal level.
- iv. There should be designated donning and doffing areas. These areas may vary based on institutional infrastructure.
- v. Ideally, designated donning areas should be different than designated doffing areas. If this is not possible, a clear separation of spaces is required.

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. Health care appropriate footwear (closed toe and heels) – as defined by Occupational Health and Safety.
3. Fluid-resistant head covering or fluid-resistant surgical hood (that covers the neck) should be worn in combination with a bouffant surgical cap (see Appendix A for definitions of “fluid impermeable” and “fluid resistant”).
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 **resistant foot and 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

Prepare for donning PPE:

1. Remove personal clothing and all personal items. Eyeglasses may be worn.
2. Perform hand hygiene with alcohol-based hand rub.
3. Securely tie back hair if required.
4. Change into hospital scrubs.
5. Put on health care appropriate footwear (as specified by Operational Health and Safety).

In designated PPE donning area:

1. Ensure trained observer is engaged and guiding the donning procedure. The trained observer may observe the health care worker donning process in the anteroom, with the health care worker.
2. Inspect PPE prior to donning. Replace PPE if defects found.
3. Put on fluid resistant knee-high leg and foot coverings.
4. Perform hand hygiene with alcohol-based hand rub and allow hands to dry before moving to next step.
5. Put on a fluid-resistant long sleeved disposable gown of sufficient length to reach mid-calf.
6. Put on bouffant surgical cap.
7. Put on surgical/procedure mask. If an aerosol generating medical procedure is anticipated, a fit-tested N95 respirator should be donned (see below).
8. Put on fluid-resistant head covering or hood, ensuring hair, ears and neck are covered.
9. Perform seal check if using N95 respirator.
10. Put on full face-shield.
11. Perform hand hygiene with alcohol-based hand rub and allow hands to dry before moving to next step.
12. Put on a pair of long inner gloves. Ensure the inner gloves are under the cuff of the gown sleeve.
13. Put on a pair of long outer gloves. Pull the glove completely over the cuff of the gown sleeve.
14. You and the trained observer must agree the PPE is on correctly, with no gaps that expose skin or mucous membranes.

Note on Aerosol Generating Medical Procedures (AGMPs)

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 resistant gown.
2. Two pairs of long nitrile gloves (chemical resistant).
3. Surgical/procedure mask.
4. Full face-shield.
5. Fluid-impermeable 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 PPE doffing room 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. While observing the health care worker doffing procedure, the trained observer should remain separated from the health care worker by a distance of two metres, and preferably behind an appropriate partition. They **may not** enter the doffing area.
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 doffing area (e.g., exit room, designated space).
4. All PPE waste must be placed carefully in the designated biohazardous waste container.
5. Walk onto disposable absorbent mat.
6. Inspect the outer gloves' outer surfaces for cuts or tears. If outer glove is cut or torn, notify trained observer.
7. Disinfect outer-gloved hands with a disinfectant wipe or alcohol-based hand rub and wait for one minute. Remove and discard outer gloves, taking care not to contaminate inner glove during removal process.
8. Inspect and disinfect inner gloves: inspect the inner gloves' outer surfaces for 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 cuts or tears are identified on the inner gloves, disinfect the inner-gloved hands with a disinfectant wipe and wait one minute.
9. 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 biohazardous waste container.
10. Disinfect inner gloved hands with disinfectant wipe or alcohol-based hand rub and allow to dry.

11. 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 biohazardous waste container.
12. Disinfect inner gloved hands with disinfectant wipe or alcohol-based hand rub and allow to dry.
13. Untie side strap of gown. Do not reach behind neck to release the Velcro neck snap. Instead, remove gown by pulling away from the body, rolling inside out being careful to avoid contaminating inner clothing. (The doffing assistant may assist). Place in biohazardous waste container.
14. Disinfect inner-gloved hands with disinfectant wipe or alcohol-based hand rub and allow to dry.
15. Remove knee-high leg and foot coverings while sitting down on designated stool. Place leg and foot coverings in biohazardous waste container.
16. Disinfect inner gloved hands with disinfectant wipe or alcohol-based hand rub and allow to dry.
17. Remove inner gloves and dispose in biohazardous waste container.
18. Carefully perform hand hygiene with alcohol-based hand rub.
19. Put on a pair of new gloves.
20. Remove surgical/procedure mask OR N95 respirator by straps. Do not touch the front of the surgical/procedure mask/N95 respirator. Discard in the biohazardous waste container.
21. Remove bouffant cap.
22. Disinfect shoes (with disinfectant wipes) while sitting on designated stool.
23. Disinfect gloves with disinfectant wipe or alcohol-based hand rub and allow to dry.
24. Disinfect designated stool with disinfectant wipes.
25. Roll absorbent mat and discard in biohazardous waste container.
26. Disinfect gloved hands with disinfectant wipe or ABHR and allow to dry.
27. Remove gloves and discard in biohazardous waste container.
28. Carefully perform hand hygiene with alcohol-based hand rub or clean sink.
29. If personal eyeglasses were worn into the room, put on a clean pair of gloves and disinfect with a disinfectant wipe.
30. Doffing assistant to vacate PPE doffing area.
31. Perform a final inspection for any indication of contamination of the hospital scrubs or otherwise on the body.
 - a. If there is evidence of contamination in doffing area, remove scrubs and dispose in biohazardous waste. Put on a clean set of scrubs and walk to shower area. Discard these clean replacement scrubs in regular garbage. **This is a breach.**
 - b. If there is not any evidence of contamination, walk to changing area to remove scrubs, and place these in regular garbage. Don a new set of scrubs.
32. Shower facilities should be available for health care workers performing high-risk patient care.

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, all the medical health officer on call to report the breach and receive further instructions.

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