Ebola Virus Disease: Interim Infection Prevention and Control Precautions for Healthcare Settings

Infection Prevention and Control Task Group

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TABLE OF CONTENTS

The Infection Prevention and Control (IPAC) Task Group has developed this document to provide infection prevention and control guidance to healthcare workers (HCWs) for the management of patients with suspected or confirmed Ebola Virus Disease (EVD).

IPAC Task Group Working Group

The IPAC task group included the Provincial Infection Control-Newfoundland Labrador (PIC-NL) members plus members representing Occupational Health and Safety and Materials Management.
The following individuals form the working group:
Marion Yetman, Chair, Provincial Infection Control Nurse Specialist, Department of Health and Community Services (DHCS)
Dr. Natalie Bridger, Infectious Diseases Specialist, Clinical Chief IPAC, Eastern Health
Amy Howard, Regional Director of IPAC, Eastern Health
Donna Ronayne, Regional Manager of IPAC, Eastern Health
Lola Gushue, Regional Coordinator of IPAC, Central Health
Paula Stagg, Regional Infection Prevention and Control Specialist, Western Health
Paula March, Regional Director of Patient Safety & Quality, Labrador-Grenfell Health
Dr. Donna Moralejo, Professor and Associate Dean, MUN School of Nursing, MUN
Cathy O'Keefe, Director, Communicable Disease Control Division, DHCS
Dana Higdon, Regional Manager, Contracts and Special Projects, Materials Support, Eastern Health
Ada Cabot, Manager, Occupational Health & Rehabilitation, Eastern Health
Janet Morgan, Occupational Health Nurse, Health & Safety Department, Central Health
Joanne Goosney, Regional Employee Health Department, Western Health
Brenda Eddison, Regional Director of Employee Development, Training & Occupational Health & Safety, Labrador-Grenfell Health
Laura Gilbert, Public Health Informatician, Public Health Laboratory, Eastern Health

Ebola virus disease (EVD)

EVD, formerly known as Ebola hemorrhagic fever, is a severe, often fatal illness in humans. The Ebola virus can spread through: contact with infected animals, contact with blood, body fluids or tissues of infected persons and contact with medical equipment (such as needles) that are contaminated with infected body fluids. The incubation period is 2 to 21 days, although 8 to 10 days is most common. Symptoms of EVD are similar to those of other viral haemorrhagic fevers, such as Marburg, and of infectious diseases like malaria or typhoid. Diagnosis can be difficult, especially if only a single case is involved. The public health risk for EVD in Canada is considered to be very low although risk is greater for Canadians who have participated in EVD response efforts in the affected African countries.

Recommended Infection Prevention and Control Measures

The following practices are based on the basic principles of infection prevention and control found in the Provincial Guideline on "Routine Practices and Additional Precautions across the Continuum of Care".[1] Other sources of information to guide these recommendations include: Public Health Agency of Canada's (PHAC) Routine Practices and Additional Precautions for Preventing the Transmission of

[1] Provincial Infection Control – Newfoundland Labrador.

Infection in Healthcare Settings,[2] the Interim Guidance – Ebola Virus Disease: Infection Prevention and Control Measures for Borders, Healthcare Settings and Self-Monitoring at Home[3], the Center for Disease Control's guideline[4] and World Health Organization's recommendations[5].

Patients with EVD may not be recognized immediately; therefore the use of Routine Practices for all patients at all times regardless of the diagnosis is the best approach to infection prevention and control. In addition to Routine Practices, **Contact and Droplet Precautions** are required for the care of patients with suspect, probable or confirmed EVD. Airborne Precautions are recommended for the care of patients requiring aerosol-generating medical procedures (AGMPs). A point of care risk assessment, central to the application of Routine Practices and Additional Precautions, should be used to guide decisions regarding when to apply personal protective equipment (PPE) (Appendix A).
Additional information on EVD and the web links are available in Appendix B.

Ebola Site Manager

The PHAC recommends that an Ebola site manager be appointed to oversee safe and effective delivery of EVD patient care with responsibility for all aspects of EVD infection prevention and control in a facility. The role of the site manager is included in Appendix C. The Health Emergency Operations Committee in each Regional Health Authority will designate a person (eg., safety officer or coordinator) to oversee the responsibility and roles as described for an Ebola site manager.

1. Screening

It is recommended that people must be assessed for EVD if they have visited an affected West African Country; Sierra Leone, Guinea, and Liberia (at present, if additional countries are added they would be noted on the PHAC's website at http://www.phac-aspc.gc.ca/index-eng.php) and have returned to Canada in the last 21 days AND

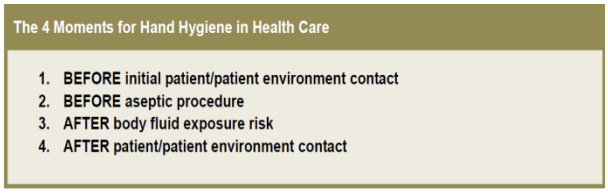
- present with a fever and/or at least one of the following additional symptoms:
- fatigue, loss of appetite, vomiting, diarrhea, headache, abdominal pain, muscle or joint pain, conjunctival injection, pharyngitis, or unexplained bleeding must be assessed for suspect EVD.

2. Point of Care Risk Assessment (PCRA)

Healthcare workers (HCWs) should have sufficient knowledge, skills and resources to perform PCRA before every interaction with a patient in order to apply appropriate control measures (Appendix A).

3. Hand Hygiene

- Hand hygiene is the single most important way to prevent the transmission of infection in healthcare settings.



[2] Public Health Agency of Canada. Routine Practices and Additional Precautions.
[3] Public Health Agency of Canada. Interim Guidance –Ebola Virus Disease.
[4] Center for Disease Control. Guidance on Personal Protective Equipment to be used by HCWs.
[5] World Health Organization. Interim Infection Control Recommendations.

- HCWs with open skin areas/lesions on hands or forearms should not have contact with suspected or confirmed EVD cases or their environment.
- Hand hygiene must be performed according to the four moments[6].
- To prevent self-contamination HCWs should avoid touching the mucous membranes of their eyes, nose and mouth with their hands.
- Hand sanitizing with a 70 to 90% alcohol-based hand rub (ABHR) is the preferred method (when hands are not visibly soiled) for cleaning hands.
- Hand washing with soap and running water must be performed when hands are visibly soiled.

4. Personal Protective Equipment (PPE)

Principles of PPE[7]

The following basic principles should be followed to ensure safe and effective use of PPE:

- All the skin must be covered by the PPE.
- The PPE must be put on (donned) correctly in the proper order prior to entry into the patient care area.
    - Sufficient and undisturbed time should be given to put on the PPE.
- The donning activities must be directly observed by a trained individual.
- PPE must remain in place and be worn correctly for the duration of exposure to the patient and the patient's environment.
- PPE should not be modified or adjusted during patient care.
- If during the care of a patient a breach in the PPE occurs, the HCW must be moved immediately to the doffing area to assess the exposure and to implement the exposure plan as indicated by the exposure.
- The removal of the PPE is a high-risk procedure that requires a structured procedure, a trained observer, a designated area for removal, a monitored process and it must be done slowly and deliberately.
- If additional or different PPE is added to the PPE recommended supplies, the risk/benefit of any modification and the necessary training that is required to ensure the correct donning and doffing processes are followed must be considered.

[6] Ontario's Agency for Health Protection and Promotion. Best Practices for Hand Hygiene in all Health Settings.
[7] Centers for Disease Control and Prevention. (October 20, 2014). Guidance on Personal Protective Equipment.

Education on PPE

- All HCWs, who will provide care for the patient with EVD should receive education specific to the EVD protocols.
- The education should consist of information on EVD to include: the disease process, transmission, and prevention plus training on the PPE; how to put it on (donning it) and how to take if off (doffing it).
- Comfort and proficiency when donning and doffing are only achieved through repeated practice on the correct use of PPE.
- HCWs should be required to demonstrate competency in the use of PPE, including the donning and doffing, while being observed by a trained observer.
- Information on the donning and doffing procedures is available in the Observer Role recommendations in Appendix D.
- A poster showing the sequence for donning and doffing is available in Appendix F.

Trained observer

A trained individual, a nurse observer in the hospital setting and an emergency medical service (EMS) professional for the prehospital setting, should be assigned to monitor appropriate selection, application, removal and disposal of PPE, and to observe and ensure HCWs are not contaminating themselves. The role and responsibilities of the trained observer are provided in Appendix D.

Designated Areas for PPE Donning and Doffing

- Specific areas must be designated for the donning and the doffing of the PPE.
- The clean areas and the contaminated areas must be clearly indicated by signage.
- The traffic must flow from the clean area to the patient area and to the clearly designated doffing area.

Selection of PPE for care of the patient with EVD

- The PPE should be standardized for all HCWs and there must be a written protocol outlining the procedure for donning and doffing the PPE which can be reviewed and monitored by the trained observer.
- Specific information on the type of PPE and the donning and doffing sequence is provided in Appendix D.
- PPE must be put on before entering the patient's room.
- Hand hygiene must be performed prior to putting on PPE and after the removal of PPE.
- PPE must be carefully removed before leaving the patient's room or in the anteroom, if the anteroom is designated as dirty.
- When removing the PPE care must be taken to avoid any contact between the soiled items and any area of the face.
- A diagram should be posted outside the room to indicate the correct technique for putting on and taking off PPE.

Gloves

- Gloves appropriate to the task must be worn when providing care.
- Gloves should fit securely over the gown cuff.
- Gloves should be changed if heavily soiled with blood or any body fluids while providing care.
- Double gloving is required.

Gowns

- A disposable, impermeable gown should be worn to cover clothing and exposed skin.
- The gown should be put on with the opening at the back and tied at the neck and at the waist.
- The cuffs of the gown should be covered by the gloves.

Head Covering

- A head covering should be fluid-impermeable, covering the head and extending down over the neck and shoulders, ensuring coverage of all exposed areas above the gown. A hood is recommended.

Facial Protection

- Facial protection should be worn.
- Facial protection requires that the eyes, nose, mouth and chin are covered.
- Face shields should be long enough to prevent splashing underneath.
- Masks with visors and eye glasses are not suitable eye protection.
- HCWs should avoid touching their faces with their hands during patient care activities.
- The facial protection should be changed if it becomes wet or soiled.

Shoes

- Closed and puncture resistant shoes should be used by all HCWs to avoid accidents with misplaced, contaminated sharp objects.[8]
- Fluid resistant covers should be used and these must be removed cautiously, while wearing gloves, to avoid hand contamination.

Leg coverings

- Leg covering should be used as there is a potential for contact with copious amounts of blood or fluids.

5. Source Containment

Source containment includes those practices that can be put in place to prevent the transmission of infection in a healthcare facility by focusing on containing the source of the infection. These include:

Triage

Symptomatic patients should be assessed in a timely manner, given a mask, and placed in strict isolation.

- Signage should be posted in waiting areas to direct patients with symptoms of acute infection.
- Supplies for respiratory hygiene and emesis management should be available.

[8] World Health Organization. Interim Infection Prevention and Control.

- A physical barrier (e.g., plastic partition at reception desk) should be located between the infectious source and susceptible hosts (i.e., other patients, staff).

Patient Placement and Accommodation

- A single room with a private toilet or commode, a designated patient sink and a no touch waste receptacle should be available.
- For practical reasons, consider an airborne infection isolation room (AIIR), if available (it has an anteroom, ensures the presence of a dedicated hand hygiene sink, allows for emergency aerosol-generating procedure to be performed, if required).
- A trained nurse observer should be posted at the patient's door to ensure appropriate and consistent use of personal protective equipment (PPE) and to monitor entry to the room.
- A log of all persons entering the patient's room should be maintained (Form 1).
- All non-essential staff should be restricted from the room.
- Clinical and non-clinical personnel should be assigned exclusively to the EVD patient and members of staff should not move freely between the EBV isolation area and other clinical areas for the duration of the shift.

Aerosol-generating Medical Procedures

- AGMPs should be anticipated and planned.
- Appropriate patient sedation should be used.
- The number of personnel in the room should be limited to those required to perform the procedure.
- The procedure should be performed by the most highly experienced staff member available.
- AGMPs should be performed in an AIIR room whenever feasible.
- Appropriate ventilation (e.g., level of air filtration and direction of air flow) should be maintained.
- Single rooms (with the door closed and away from other patients) should be used in settings where AIIR are unavailable.
- Respirators (N95, fit tested and seal-checked) should be worn by all personnel in the room during the procedure.
- Closed endotracheal suction systems should be used wherever possible.
- Visitors should not be present.

Visitor Management

- Visitors to the patient's room should be avoided; exceptions may be considered on a case by case basis for those who are essential for the patient's comfort and care, such as a child's parents.
- Visitors, deemed essential, must be provided with information about the disease and the required precautions (i.e., hand hygiene, PPE) for entering the room and leaving the room.
- A log must be maintained of all visitors entering and leaving the patient's room (with times documented).
- This log must be provided to Public Health (PH) as they will be providing follow-up for community contacts.
- Visitors who were exposed to the patient before they were admitted should be screened for infectious symptoms.
- The designated Ebola coordinator will forward to Public Health for follow-up, the names of visitors who have entered the room.

Handling of Human Remains

- Handling of human remains should be kept to a minimum (e.g., no autopsies unless necessary, no embalming, and no post-mortem care).
- Only trained personnel should handle the deceased.
- Enhanced PPE should be worn by all who have contact with the deceased.
- Medical devices (i.e., intravenous catheters, urinary catheter, or endotracheal tubes) may be left in place.
- At the site of the death, the body should be wrapped in a plastic shroud:
    - Care should be taken to prevent the contamination of the exterior surface of the shroud;
    - A leak-proof body bag should be used over the shroud;
    - Once closed the body bag should not be re-opened.
- Surface decontamination of the outer bag should be performed by removing visible soil on the outer surfaces with a broad spectrum virucidal disinfectant, in according to the manufacturer's instruction.
- Post-mortem examinations and human remains handling should be in accordance with federal and provincial/territorial regulations.
- Post-mortem examination should be limited to essential evaluations only and should be performed by trained personnel using appropriate PPE (including a respirator and shoe covers).
- Specimens should be placed in clearly-labelled, non-glass, leak-proof containers and delivered directly to the designated specimen handling area.
- All external surfaces of specimen containers should be thoroughly disinfected prior to transport.
- Tissue or body fluids for disposal should be carefully placed in clearly marked, sealed containers for incineration.

6. Environmental Controls

Environment controls include protocols put in place to manage the following environment issues:

Patient care equipment

- Only essential items should be taken into the room.
- Dedicated medical equipment, preferably disposable, should be used for the provision of patient care.
- All non-disposable medical equipment used for patient care should be kept in the room (if possible) until the patient is discharged and then cleaned and disinfected according to manufacturer’s instructions.
- Responsibility and accountability for the reprocessing of non-critical patient care equipment should be assigned.

Sharps Management

- The use of needles and other sharps should be limited as much as possible.
- Safety engineered devices should be available and used.

- Only those individuals extremely skilled in performing phlebotomy should draw blood or start intravenous lines.
- Phlebotomy and laboratory testing should be kept to the minimum necessary for essential diagnostic evaluation and patient care.
- All needles and sharps should be handled with extreme care and disposed in a puncture-proof container.
- The puncture-resistant containers for sharps should be placed as close as possible to the point of care.
- Sharps should not be carried in the hands but placed in a kidney dish for moving them to the sharps container or a portable sharps container should be used.
- The containers must be securely sealed and replaced when ¾ full.

7. Environmental Cleaning

Although there are no products with specific label claims against the Ebola virus, enveloped viruses such as Ebola are susceptible to a broad range of hospital disinfectants used to disinfect hard, non-porous surfaces.[9] A disinfectant with a broad spectrum virucide claim with a DIN should be used according to the manufacturer's instruction. Education and appropriate PPE should be available for staff responsible for cleaning.

- PPE should be worn when cleaning the environment and handling infectious waste.
- The room, including all horizontal surfaces, should be cleaned twice per day and when soiled.
- Additional cleaning may be required.
- Any container surfaces (garbage bins, linen hampers) must be disinfected before removal from the isolation room.

Management of linen, waste and dishes

Linen

- Linen can be heavily contaminated with body fluids (e.g., blood, vomit, feces) and splashes may result during handling.
- All linen should be considered biomedical waste and should be disposed as per the waste management guidelines.
- The room should contain a clearly identified no-touch biohazard linen waste receptacle containing a biohazard bag.
- Soiled linen should be handled with a minimum of agitation and placed in a designated no-touch biohazard waste bag at the point-of-use.
- The bags should be removed from the room as per waste disposal protocol.

Waste

- Waste such as feces, urine and vomit can be disposed of in the sanitary sewer.
- All waste should be considered biomedical waste.
- The room should contain a clearly identified no-touch biohazard waste receptacle containing a biohazard bag.
- When ¾ filled the bags should be removed from the container and closed. The bags will then be transferred to the outside of the room via a two-person transfer.

[9] Center for Disease Control. Interim Guidance for Environmental Infection Control in Hospitals for Ebola Virus.

- Environmental Services will be called to remove the biomedical waste from the area.

Dishes
- Disposable dishes should be used.

8. Education

- HCWs should be provided with information about the disease and required precautions.
- Patients and families should be provided with information about the disease and the precautions to be used when caring for a family member.

9. Occupational Health

Fitness to provide care
Certain conditions may preclude some HCWs from providing direct care for of patients with EVD. These include:

- HCWs with open skin areas/lesions on hands or forearms;
- Pregnant HCWs.

A HCW with other concerns about their fitness for working with patients with EVD should be referred to their Manager and an Occupational Health professional for an individual assessment.

Post exposure follow-up
- The person designated by the EOC (safety officer or coordinator) should forward a copy of the log containing the names of all HCWs who entered the room of the patient to the OHN at the completion of each shift or at a prearranged time.
- The OHN will follow all HCWs who entered the room as per the protocol available in Appendix E.

10. Duration of Precautions

- Patients suspected to have EVD should be maintained on Ebola specific precautions until the diagnosis of EVD is excluded.
- The duration of precautions for a patient with confirmed EVD will be determined on an individual basis on the recommendations of the patient's EVD Care Team.

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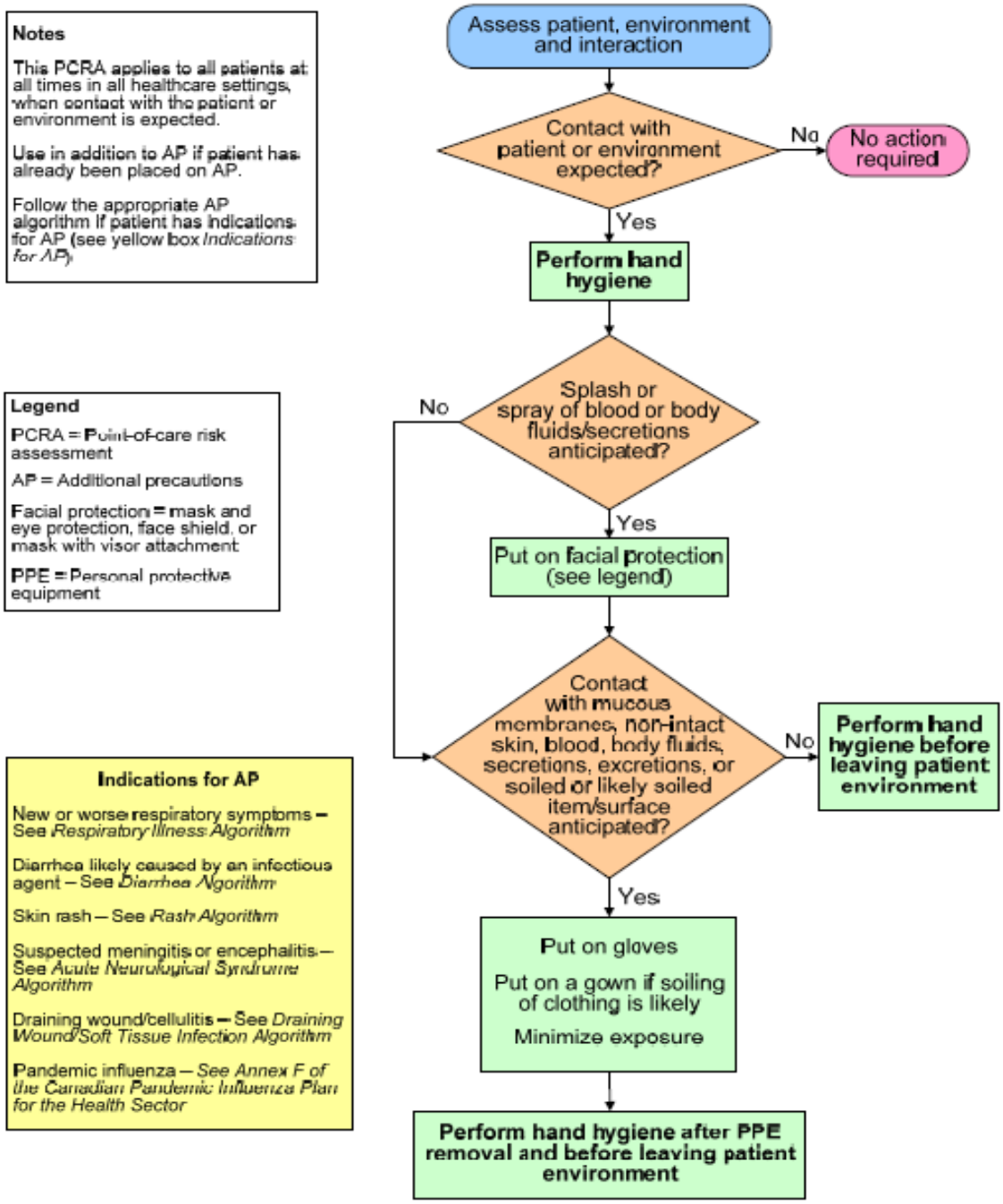
Appendix A: Point of Care Risk Assessment



Appendix B: Additional information on EVD

Document Name	Link
EVD Information for Health Professionals	http://www.phac-aspc.gc.ca/id-mi/vhf-fvh/ebola-professionals-professionnels-eng.php
National Surveillance Case Definitions for Ebola	http://www.phac-aspc.gc.ca/id-mi/vhf-fvh/national-case-definition-nationale-cas-eng.php
Case Report Form	http://www.phac-aspc.gc.ca/id-mi/vhf-fvh/evd_crf-mvd_fdc-eng.php
Environmental Decontamination of Conveyances	http://www.phac-aspc.gc.ca/id-mi/inf-cont-inf/sanitation-hygiene-eng.php
Ebola – Pathogen Safety Data Sheet	http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/ebola-eng.php
Interim Biosafety Guidelines for Laboratories Handling Specimens from Patients Under Investigation for Ebola Virus Disease	http://www.phac-aspc.gc.ca/id-mi/vhf-fvh/ebola-biosafety-biosecurite-eng.php
Interim Clinical Care Guidelines	http://www.ammi.ca/media/69846/Ebola%20Clinical%20Care%20Guidelines%202%20Sep%202014.pdf
Infection Prevention and Control Expert Working Group: Advice on Infection Prevention and Control Measures for Ebola Virus Disease in Healthcare Settings	http://www.phac-aspc.gc.ca/id-mi/vhf-fvh/ebola-ipc-pci-eng.php
Public Health Management of Cases and Contacts of Human Illness Associated with Ebola Virus Disease	http://www.phac-aspc.gc.ca/id-mi/vhf-fvh/cases-contacts-cas-eng.php

Appendix C: Responsibility of Ebola Site Manager

Table 1: Responsibility and Role of the Ebola Site Manager[10]

Responsibility	To oversee safe and effective delivery of EVD patient care with responsibility for all aspects of EVD infection prevention and control in a facility.
Role	Oversee the overall safe care of EVD patients in a facility at all times.
	Oversee the implementation of administrative and engineering controls.
	Monitor and evaluate by direct observation, care before, during and after HCW enters an isolation or treatment area.
	Provide immediate corrective instruction in real-time if HCW is not following recommended steps.
	Know and apply the facility EVD exposure management plan in the event of an unintended breach in procedure.
	Monitor and evaluate supplies.
	Monitor entry to the room (i.e., limit entry to only essential HCWs)
Number needed	At least one Site Manager should be onsite at all times in the location where an EVD patient is being provided care.

[10] Public Health Agency of Canada. Infection Prevention and Control Expert Working Group: Advice on Infection Prevention and Control Measures for Ebola Virus Disease in Healthcare Settings.

Appendix D: EVD Observer Role

Using the correct procedure for donning and doffing of personal protective equipment (PPE) has been identified as being critical in the preventing the transmission of EVD.

It is recommended that a trained individual, in the hospital a nurse observer and in prehospital care an emergency medical service (EMS) professional, be present to monitor the infection prevention and control (IPAC) precautions for the care of the patient with EVD. The observer will be knowledgeable about all PPE recommended in the facility's protocol, the correct donning and doffing procedures including the disposal of used PPE and will be qualified to provide guidance and technique recommendations to the HCW. The protocol for the EMS observer will be developed in a separate document as they will be using the jumpsuit. The specific tasks of the nurse observer include:

- To monitor the appropriate selection and availability of the appropriate PPE in the donning area (Table 1)
- To review the donning and doffing sequence with the HCW prior to starting the process (Table 2)
- To oversee the donning and doffing of the PPE with the use of a check list (Table 3)
- To observe the HCW during the care of the patient with EVD to determine if contamination occurs
- To follow the protocol for the action required if the HCW does self-contaminate (Appendix E)
- To restrict the access to the room to those considered essential
- To document the names of all who enter the room using the appropriate form (Form 1)

The key to all PPE is consistent implementation through repeated training and practice.

The list in Table 1 identifies the standardized PPE for all HCWs who interact with the patient with EVD. If these items are not available in the donning area the observer must notify the designated Ebola site coordinator immediately.

Table 1: Recommended PPE Supplies.

PPE Item	Rationale for Using It
Surgical scrubs Dedicated enclosed footwear	Surgical scrubs facilitate the donning and doffing process and eliminate concerns of contamination of personal clothing.
Impervious Gowns or jumpsuit*	Single-use (disposable) impermeable gowns (level 4) that extends to at least mid-calf or jumpsuit will provide the highest level of protection against fluids and secretions.
Gloves (outer glove) Nitrile 12 in gloves	Single-use (disposable) nitrile examination gloves with extended cuffs ensure that no skin is exposed at the wrist.
Surgeons glove (inner glove)	Surgeon glove provided more dexterity for doing medical procedures.
Face shield	Single-use (disposable) face shield give total protection of the face from fluids.
N95 respirator	A respirator is required in the event of unexpected aerosol-generating medical procedure (AGMP).
Boot/leg covering (fluid resistant)	A single-use (disposable) fluid-resistant boot/leg covering that extend to at least mid-calf will protect the legs and feet from fluids and secretions.
Head covering, hood recommended	A hood is recommended to fully cover the head and extend down over the shoulders to protect the head and neck area.
*Jumpsuit for EMS	A jumpsuit is recommended for EMS staff who are providing care in an uncontrolled environment and could be exposed to outdoor elements (winds etc.).
Powered air-purifying respirator (PAPR)	A PAPR with a full face shield, helmet or headpiece is being sourced for EMS. It should be noted that N95 can provide this protection during AGMPs in the event that the HCW may find the PAPRs difficult to use.

	Additional training will be provided for those using PAPRs.

Other items:

Hand hygiene product

Disinfectant wipes

Table 2: Sequence for putting on (donning) and taking off (doffing) PPE.

Putting on PPE	Taking off PPE
• There **must** be a nurse observer present to supervise the HCW donning and doffing process. • A scrub suit should be available for the HCW assigned to the care of the patient and for the nurse observer.	When/where: immediately prior to exiting the room (close to the exit) or in the anteroom The doffing area should be clearly indicated by signage. It should contain disinfectant wipes, ABHR, a chair and a biomedical waste container.
When/where: immediately prior to entering the room or in the anteroom • Assemble equipment according to the sequence for putting it on • Remove all hand and arm jewelry • Keep hair off shoulders and away from the face	The observer will inspect the HCW for any visible contamination and for any cuts or tears to the PPE equipment. If noted, the HCW will disinfect the equipment with the disinfectant wipes.
• **Perform hand hygiene**	• Remove boot/ leg covers (Sit to do this) • Disinfect chair and decontaminate hands with disinfectant wipes
	• Untie gown at waist
• Put on boot/leg covers over enclosed shoes (Sit on chair to do this)	• Remove outer gloves carefully
• Put on inner gloves	• Inspect inner glove for any visible contamination, cuts or tears
• Put on gown, have assistant tie inside ties and then do ties on the side	• Disinfect inner gloves
• Put on N95 respirator and fit check it	• Remove the face shield by tilting the head forward, grasping the straps and pulling it over the head without touching the hood or face
• Put on the hood	• Disinfect gloves
• Put on the face shield	• Remove the hood by tilting the head forward and gently pull it from the top in one motion
	• Disinfect gloves
• Put on outer gloves	• Remove the gown slowly and carefully. Pull the gown away from the body and roll it down
	• Remove inner gloves
	• **Perform hand hygiene**
	• Remove the N95
	• **Perform hand hygiene**

November 5, 2014

A critical role of the observer is to ensure that the PPE is put on and taken of safely. HCWs may need additional practice sessions in order to attain competency with the protocols.

Table 3: Check list for monitoring the PPE sequence

Donning Procedure				
Element	**Compliance**			
	Yes	No	N/A	Deficiency Noted
Before Putting it On				
HCW is wearing a scrub suit and closed shoes on arrival at the donning area.				
The list is available with the supplies required for the care of the patient.				
The appropriate PPE in the correct size is available for the encounter with the patient according to the supply list.				
The PPE is assembled on a counter in the order that it will be put on.				
The nurse observer reviews the process for donning with the HCW using the checklist.				
Nurse observer puts on the PPE first.				
HCW observes the donning process for the nurse observer.				
Donning the PPE				
All jewelry and other personal items that would impede the safe use of PPE are removed; cell phone, lanyards, pager, etc.				
The hair is off the shoulders and away from the face.				
Hand hygiene is performed using an				

alcohol based hand rub (ABHR).				
Boot/Leg covers are put on over the closed shoes.				
The HCW sits to do this.				
The first set of gloves, the inner gloves, is put on.				
The gown is put on.				
The gown is fastened at the neck, waist and back using Velcro/ties.				
The observer ties the back.				
The gown provides full coverage and is securely fastened.				
The appropriate fit tested respirator is put on.				
The N95 is placed over nose, mouth and chin.				
The N95 is secured on the head with top elastic.				
The bottom elastic is then place over the head and below the top elastic.				
The flexible nose piece is fitted over nose bridge.				
A fit check is performed.				
The hood is positioned to cover the head and neck.				
The face shield is positioned over the face and secured at the brow with the adjustable strap.				
The outer set of gloves is put on and extends over the cuff off the gown.				

The PPE covers the body completely and securely.				
The observer does a final check of the HCW to ensure that the PPE provides complete protection and is fitting comfortably.				
Doffing of PPE				
The doffing area is clearly identified by signage.				
A cleanable chair is available in doffing area.				
ABHR and disinfectant wipes are available in doffing area.				
A biomedical waste bucket with a red bag is available for PPE disposal.				
HCW moves to the doffing area.				
A disposable pad is provided by nurse observer.				
HCW positions the pad as required to place the shoes on following removal of boot covers.				
HCW inspects the PPE for any gross contamination.				
Gross contamination is removed with disinfectant wipes.				
The HCW sits to remove boot/ leg covers.				
The legs are not crossed over.				
The boot/leg covers are rolled down slowly and carefully removed over the feet.				

The HCW stands on the blue pad.				
Disinfectant wipes are used to disinfect the chair and the gloves.				
The HCW unties the gown at the waist.				
The outer gloves are removed.				
The inner gloves are inspected for any visible contamination, cuts or tears.				
The inner gloves are disinfected.				
The face shield is removed by tilting the head forward and grasping the strap from behind and pulling it over the head being careful not to touch the front of the shield.				
The gloves are disinfected.				
The hood is removed by tilting the head forward and grasping the hood at the top and pulling it off in one single motion.				
The gloves are disinfected				
The gown is removed by undoing the velcro at the neck and then gently tugging on the gown from the back to undo the ties.				
Leaning forward slightly, the gown is then removed in a rolling manner to help prevent contamination.				
The inner gloves are removed.				
Hand hygiene is performed.				
The N95 is removed as described below.				
Bottom tie or elastic is grasped and				

lifted over the head.				
Top tie or elastic is grasped and the respirator is lifted away from the face while holding the elastic band.				
The front of the respirator is not touched.				
Hand hygiene is performed.				
HCW is inspected for any indication of contamination of the surgical scrubs.				
IPAC /OH is informed immediately if there is contamination of the scrubs.				
HCW leaves the PPE doffing area with surgical scrubs and footwear.				
HCW showers at the end of the shift before donning clean clothes.				

The nurse observer will document the names of all who enter the EVD patient room including HCWs and any visitors. If there is any breach of the PPE the nurse observer must notify the OH/IPAC staff immediately. The names of all those who enter the room should be sent to the OH staff at the end of each shift.

Form 1: Log sheet for documenting the names of those who enter the EVD patient room.

Date	Time-in	Time-out	Name	Job Title/Department	Reason for entering Patient Room	Comments

Appendix E: HCW and Potential EVD Exposure

EVD Post Exposure Management

In the event that a HCW has an exposure to the Ebola virus during the delivery of care to the patient with EVD the Occupation Health Nurse (OHN) will provide follow-up. The definitions, potential healthcare setting exposure types, immediate actions and the 21 day follow-up actions are provided in this protocol. The monitoring will be for 21 days following the last possible exposure.

Definitions

In Table 1 an overview of the terms used for the follow-up of the potentially exposed HCW are defined.

Table 1: Definitions for follow-up of HCW contacts

Term	Definition
Active daily monitoring	The HCW is contacted by OHN or PH a minimum of once per day to assess for the presence of symptoms and fever. This can be at a prearranged time convenient to the HCW.
Measure temperature	The HCW must check and record the temperature with a FDA approved oral thermometer twice daily.
Monitor symptoms	HCW will self-monitor for any of the following symptoms: severe headache, muscle pain, malaise, sore throat, vomiting, diarrhea and rash.
Isolation	This means the separation of sick people with a communicable disease from well people.
Self-isolate	The HCW would limit contact with others.
Controlled movement	Limits the movement of people. Travel by air, water, bus or train or other public transport is not allowed.
Nurse observer	A trained observer who supervises the HCW putting on and taking off the PPE, monitors the HCW while in the patient care room and documents the names of all those who enter the room.

Potential Healthcare Setting Exposures

- Percutaneous or mucocutaneous exposure to blood, body fluids, secretions or excretions
- HCW has a breach of Personal Protective Equipment (PPE) such as:
    - PPE not covering all the skin and body fluids touch the skin
    - PPE not securely fitting and HCW touches face
    - N95 respirator becomes wet

Immediate action:

- The nurse observer would direct the HCW to immediately leave the patient care room.
- The exposure should be reported immediately to the manager/supervisor and OHN or delegate and immediate medical attention should be obtained.
- The HCW would remove the PPE in the designated doffing area.
- First aid would be given:
    - The site of a percutaneous injury should be thoroughly rinsed with running water, and any wound should be gently cleansed with soap and water.
    - Mucous membranes of the eyes, nose or mouth should be flushed with running water if contaminated with blood, body fluids, secretions or excretions.
    - Non-intact shin should be rinsed thoroughly with running water if contaminated with blood, body fluids, secretions or excretions.
- An in-depth assessment of the exposure should be undertaken by OHN and IPAC.
- Management for blood-borne pathogens (as per usual organization policy) would be initiated.
- Collaborate with the Medical Officer of Health (MOH) and/or Clinical Chief of Infection Prevention and Control for consensus on the recommended follow-up.

Follow-up of HCWs

The CDC[11] has recommended that the follow-up of HCW be determined by the degree of exposure. The risk categories are defined in Table 2.

Table 2: Risk stratification for HCW exposure situations.

Category of risk	Exposure situation
High risk	• Percutaneous or mucocutaneous exposure to blood, body fluids, secretions and excretions.
Some risk	• Close contact with a person showing symptoms of Ebola without the use of PPE. • Close contact means being within six feet of the person with Ebola for a long time without wearing PPE.
Low risk	• Being in the same room for a brief period of time (without direct contact) with a person showing symptoms of Ebola • Having brief skin contact with a person showing symptoms of Ebola when the person was believed to be not contagious. • In countries without widespread Ebola transmission (e.g., NL): direct contact with a person showing symptoms of Ebola while wearing PPE.

[11] Center for Disease Control. (October 27, 2014). Interim US Guidance for Monitoring and Movement of Persons with Potential Ebola virus Exposure.

Advice for HCW[12]

- Temperature must be taken orally and recorded twice daily in the temperature log (Table 5).
- Report any increase in temperature to OHN immediately (as opposed to waiting for OHN to contact them as part of active daily monitoring).
- Antipyretic medication should not be taken during the monitoring period if possible.
- Self-monitoring should be undertaken for the appearance of any other early symptoms of EVD including severe headache, muscle pain, malaise, sore throat, vomiting, diarrhea and rash.
- If symptoms develop the individuals should self-isolate as quickly as possible and contact the OHN or Healthline.

Symptomatic individuals

Symptomatic individuals in any of the risk categories who meet the symptoms category must be followed as a suspect case.

Notification if symptoms occur

Symptoms occur at work:

- HCW should stop work and immediately report to the nursing supervisor.
- HCW should try to keep at least six feet from other people, put on a mask and gloves and call the Emergency Room to request assistance and direction.

Symptoms occur at home:

- During the day (0800-1600) the HCW should notify the OHN.
    - The OHN would interview the HCW on the phone and then call the regional MOH for further directions.
- During the evening the HCW should call the HealthLine at 1-888-709-2929.

Asymptomatic individuals

The follow up actions are dictated by the risk level as provided in Table 3.

Table 3: Recommended follow-up for asymptomatic individuals.

Risk level	Follow-up Actions		
	Monitoring	**Restricted Public Activities**	**Restricted Travel**
High Risk	Active Monitoring	Yes	Yes
Some risk	Active monitoring	As determined by MOH	As determined by MOH
Low risk	Active monitoring	No	No

Summary of Follow-up Actions

A summary of the recommendations of the follow-up action for HCW is included Table 4.

[12] Public Health Agency of Canada. (August 23, 2014). Public Health Management of Cases and Contacts of Human Illness Associated with Ebola Virus Disease (EVD).

Table 4: Summary of Follow-up Actions for exposed HCWs

Exposure category	Clinical Criteria	Action
High risk situations		
• Percutaneous (e.g., needle stick) or mucous membrane exposure to blood or body fluids of a patient with Ebola while the patient was symptomatic • Exposure to the blood or body fluids (including but not limited to feces, saliva, sweat, urine, vomit, and semen) of a patient with Ebola while the patient was symptomatic and the HCW was without appropriate PPE	Asymptomatic	• Active daily monitoring • Controlled movement exclusion from all long-distance and local public conveyances (air, water, train, or bus) • Exclusion from providing clinical care • Non-congregate public activities while maintaining a six foot distance from others may be permitted (walk or jog in park)
	Symptomatic	• Immediately self-isolate and contact OHN/HealthLine
Some risk		
Some risk • Close contact in a healthcare facility with a patient with Ebola while the patient was symptomatic. • Close contact is defined as being for a period of time, within six feet of a patient with Ebola, while the patient was symptomatic and the HCW was not wearing appropriate PPE	Asymptomatic	• Active daily monitoring • The activity for the HCW will be determined on an individual basis as directed by the MOH
	Symptomatic	• Immediately self-isolate and contact OHN/HealthLine
Low risk		
• Direct contact while using appropriate PPE with a person with EVD while the person was symptomatic	Asymptomatic	• Active daily monitoring • No restrictions on travel, work, public conveyances, or congregate gatherings
	Symptomatic	• Immediately self- isolate and contact OHN/HealthLine

Table 5: Temperature Log

Day	Date	Morning		Evening		Medications taken today (list them).	Other Ebola symptoms*
		Time AM	Temperature Reading	Time PM	Temperature Reading		
Day 1							
Day 2							
Day 3							
Day 4							
Day 5							
Day 6							
Day 7							
Day 8							
Day 9							
Day 10							
Day 11							
Day 12							
Day 13							
Day 14							
Day 15							
Day 16							
Day 17							
Day 18							
Day 19							
Day 20							
Day 21							

***Fever equal to or greater than 38°C (100.4°F), chills, severe headache, muscle pain and weakness, sore throat, diarrhea, vomiting, stomach pain, unusual/new rash, unusual bleeding**

Appendix F: PPE Sequence Poster

Enhanced Personal Protective Equipment (PPE)

A nurse observer is assigned to ensure the donning and doffing is completed in the correct sequence according to the checklist.

DONNING

1. Prior to Donning

Wear surgical scrubs under PPE.

Assemble all PPE on a table/cart in the order that it will be put on.

Remove all jewelry and items such as cell phones, lanyards with IDs, etc.

Ensure hair is off shoulders and away from the face.

2. Hands

Perform hand hygiene using an alcohol-based hand rub (ABHR) or soap and water.

3. Leg and Boot Covers

Put on leg and boot covers over enclosed shoes - sit to do this.

4. Inner Gloves

Put on inner gloves.

5. Gown

After the nurse observer assists with inner ties on the back of the gown secure upper closure and tie gown on the side.

6. N95 Respirator

Put on N95 respirator and perform a fit check.

7. Hood

Pull down over neck and shoulders.

8. Eye/Face Protection

Adjust straps to fit the head.

9. Outer Gloves

Ensure gloves cover cuffs of gown.

10. Final check of PPE

Nurse observer completes a final check to ensure PPE covers the body completely.

DOFFING

1. Inspection

Inspect PPE for gross contamination.
If present, use a disinfectant wipe to reduce visible soil.

2. Leg and Boot Covers

Remove leg and boot covers in the sitting position. Legs must not be crossed. Use disinfectant wipes to disinfect the chair and outer surface of the gloves.

3. Gown and Outer Gloves

a. Untie gown at waist.
b. Remove outer gloves.
c. Decontaminate inner gloves.

4. Face Shield

a. Remove face shield.
b. Decontaminate gloves.

5. Hood

a. Remove hood - tip forward at the waist, grasp the hood at the top and pull it off in one fluid motion.
b. Decontaminate gloves.

6. Gown

Unfasten the neck and **gently tug** the gown from the back or the observer may assist with the velcro/ ties on the back. Leaning forward, remove the gown in a rolling manner.

7. Inner Gloves

a. Remove inner gloves.
b. Perform hand hygiene.

8. N95 Respirator

a. Remove N95 respirator.
b. Perform hand hygiene.

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