Ebola Basics
for Health Care Workers

Infection Prevention and Control and the Viral Hemorrhagic Fever (VHF) Contingency Plan

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Background

- This document was originally intended to provide new information and guidance during the recent 2014 Ebola virus disease (EVD) outbreak in West Africa
- The current revision outlines infection prevention and control management for any suspected or confirmed case of an infectious strain of Viral Hemorrhagic Fever (VHF)

Viral Hemorrhagic Fevers(VHF)

- **VHFs are caused by a wide range of viruses from four distinct viral families**
  - **Filoviridae** (includes Ebola, Marburg)
  - **Arenaviridae** (includes Lassa, Machupo)
  - **Bunyaviridae** (includes hantaviruses, Crimean Congo hemorrhagic fever, Rift Valley Fever*)
  - **Flaviviridae** (includes Yellow Fever*, Dengue*)

***No human-to-human transmission, only through mosquito or tick bites**

Common Features of VHF viruses

- RNA viruses enveloped in a lipid coating
- Natural reservoirs are animals or insect hosts
- Geographically restricted to areas in which their host species live
- Transmission to humans depends on the specific virus but includes:
  - **Contact with urine, feces, saliva or blood of animal hosts (rodents, fruit bats, primates)**
  - **Mosquito or tick bites**
  - **Contact with vector-infected livestock**
  - **Consuming infected bush meat**
- Person-to-person transmission may occur with some viruses (Ebola, Marburg, Lassa and Crimean-Congo) through close contact with infected body fluids of an infected person or indirectly through contaminated objects

Common Features of VHF viruses

Human outbreaks can occur when a VHF infection is transmitted from an animal host, followed by human-to-human transmission in home or health care setting

VHFs are diseases of public health significance due to:

- **Low infectious dose required for infection**
- **High morbidity and mortality in human cases**
- **Effective vaccines and treatments are unavailable for most**

The recent 2014 Ebola virus disease (EVD) outbreak in West Africa was the largest outbreak of EVD in history

What did we learn from this EVD outbreak?

- Cases are not communicable before the onset of symptoms
- Virus levels in a patient's blood at the time of fever and symptom onset are low, but gradually ↑ and are highest late in the disease course (with copious fluid loss)
- The bodies of deceased EVD-infected persons are highly infectious
- Direct contact with blood or body fluids of infected persons without using personal protective equipment (PPE) increased risk of transmission in households and health care settings
- Cases remain communicable as long as blood or other body fluids contain the virus
- Airborne transmission of EVD among humans has never been demonstrated

What did we learn from this EVD outbreak?

From the survivors, we now know that Ebola virus can persist in areas of the body that are difficult for the immune system to reach:

- **eyes** – ocular fluids (but not tears)
- **central nervous system** (spinal cord and brain) – cerebral spinal fluid (CSF)
- **Male reproductive tract** including semen
- **Mammary glands** – breast milk
- May also persist in the fetus, amniotic fluids, placenta and breast milk of women who were infected while pregnant

Clinical Presentation of EVD

- Symptoms begin 2 to 21 days after exposure (**usually 8-10 days**)
- **Early symptoms are flu-like** and include the following:
  - **<u>sudden onset of fever >38°C</u>, as well as sore throat, chills, muscle pain and weakness, headache and malaise**
- Many more common tropical diseases have very similar symptoms and are more likely the cause of illness with fever
  - **Malaria, typhoid fever, typhus fever, influenza**
- **Later symptoms include:**
  - Maculopapular rash around day 5
  - Nausea, vomiting, abdominal pain, diarrhea
  - Respiratory symptoms including chest pain, shortness of breath and cough
  - Internal or external bleeding (develops in about 30% of cases)

The table below shows how a person with Ebola becomes more infectious over time.

		Period of Illness		
	Incubation period	Early symptoms	Mild symptoms	Severe symptoms
Time	2-21 days	0-3 days	3-10 days	7-12 days
Symptoms	**NO SYMPTOMS**	**FEVER, MUSCLE PAIN, FATIGUE HEADACHE SORE THROAT**	**DIARRHEA VOMITING STOMACH PAIN HICCUPS**	**SEVERE DIARRHEA & VOMITING *BLEEDING***
Infectivity	**NONE**	**LOW**	**MODERATE TO HIGH**	**HIGH**
Risk of spread by body fluids	**NEGLIGIBLE**	**VERY LOW**	**MODERATE TO HIGH**	**VERY HIGH**

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Key Ebola Virus Disease Facts

- Transmitted from person to person ONLY through **close and direct physical contact with an infected individual or their blood or body fluids**
- **Airborne transmission has not been demonstrated in human studies**
- Individuals infected with Ebola are **not infectious before the onset of symptoms**
- **Infectiousness of body fluids (viral load) increases as patient becomes more ill**
- **Strict adherence to Infection Prevention and Control Practices** is extremely effective in preventing **Ebola virus transmission to HCWs**

Level of Risk to Saskatchewan residents

- **Once identified, all VHFs normally remain in well-defined geographical area**
- **Most infected individuals will likely know if they had some risk of exposure (personal or healthcare related contact with a sick person from this area)**
- **Other than returning health care or humanitarian workers, infected people are unlikely to travel to Saskatchewan**

VHF Preparedness in Canada

- Airport monitoring of patients arriving from areas affected by an emerging illness or an area with a VHF Outbreak
- Provincial governments support Public Health measures, infection control practices and a 3 tiered approach to hospital readiness
- Regional health authorities are prepared to identify and manage a person identified with a potential VHF diagnosis safely

Three Tiered Approach

Persons under active monitoring for EVD, who develop signs and symptoms will be transferred directly to an assessment facility

Transfers to Tertiary Centre will depend on consultations with public health officials and capacity of Assessment Facility

Frontline Health Care Facility

Quickly identifies and isolates patients with possible EVD	Notifies local public health officials and infection control. Prepares for patient transfer if necessary

EVD Assessment/Treatment Facility

Safely receives and isolates a patient, provides immediate lab evaluation and coordinates testing for EVD	Cares for patient (including evaluation and management) until Ebola diagnosis is confirmed or ruled out

Tertiary Ebola Treatment Center

Safely receives, isolates and cares for a patient with confirmed Ebola for duration of illness	Has sustainable staffing and resources to manage ongoing care needs

Infection Prevention and Control Measures

Although the risk of VHF transmission is remote, it is important to remember that

- **continued awareness about emerging diseases and international outbreaks**
- **consistent and appropriate use of Routine Practices in every situation and health care setting**

will ensure that care providers and patients are protected from any risk of exposure during initial assessment and care of any patient, anywhere.

ROUTINE PRACTICES INCLUDE:

Complete a thorough point of care risk assessment prior to any patient encounter that considers:

- **The clinical conditions/symptoms of the patient**
- **The proposed procedure/task to be completed**
- **The potential response of the patient to that procedure**

Make sure the selection of personal protective equipment (PPE) = **Provides protection from the risk of exposure to body fluids**

ROUTINE PRACTICES INCLUDE:

Hand hygiene according to the "4 Moments"

ROUTINE PRACTICES INCLUDE:

- Cleaning and disinfection of all shared patient care equipment
- Regular environmental cleaning using a hospital approved disinfectant
- Meticulous attention to safety around the use of needles and sharps; including the use of safety-engineered medical sharps, needleless IV systems and safe disposal practices

ROUTINE PRACTICES INCLUDE:

Organizational support and planning that includes:

- **Triage design and procedures to quickly identify symptomatic patients and initiate isolation measures**
- **Availability of isolation areas or airborne infection isolation rooms**
- **Availability of standard and enhanced PPE in locations accessible to staff requiring it**
- **Training of staff on the selection, application use, removal and disposal of PPE**

When to Suspect Viral Hemorrhagic Fevers

- International travel can expose persons to a number of diseases including VHF
- A travel history should always be a part of routine patient evaluation

Consider VHF when individuals who within 3 weeks before the onset of fever have:

- Travelled in the specific local area of a country where VHF has occurred
- Had contact with blood, other body fluids of a person or animal with VHF
- Worked in a laboratory or animal facility that handles viral hemorrhagic viruses

Know and Use Your Screening Tools diligently

REMEMBER!

Ask every patient:

Have you recently travelled outside of Canada?

If yes:

- Where and when?
- What are your symptoms?

➢ **THINK**
Do travel history and symptoms suggest an infectious disease?

If yes:

➢ **ISOLATE** the patient in a separate room immediately.

➢ **TELL** a primary care provider to assess the patient.
Primary care provider will call the MHO as appropriate.

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Not feeling well?

If you:

- Have a **fever** or other symptoms
  and
- Have **recently travelled outside Canada**

Tell a staff member immediately about your travel history.

You may be asked further questions to provide safe care.

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Emergency Departments

EBOLA / VIRAL HEMORRHAGIC FEVER[1] (VHF)

INITIAL CLINICAL ASSESSMENT AND MANAGEMENT FLOW MAP

A. In the past 21 days has the patient been in a country where there is widespread transmission of Ebola[2] or a country where VHF is endemic[3] AND does the patient report having a fever or other symptoms consistent with Ebola[4]?

OR

B. In the past 21 days has the patient cared for, come into contact with body fluids, or handled clinical specimens from an individual known or strongly suspected to have Ebola AND does the patient report having a fever or other symptoms consistent with Ebola[4]?

NO to A & B
If symptomatic, evaluate for other Illness

Primary Practitioner to:
Complete "Ebola Virus Disease (EVD) Assessment Form"

Notify Regional Medical Health Officer (MHO)

Notify Infectious Disease (ID) physician on call[5]

Staff to notify:
Senior Leader on call

YES to A or B

1. Minimize contact with patient: Do not take vital signs or complete further assessment, do not draw blood (phlebotomy, finger prick) for diagnostic testing.
2. Have patient put on a surgical or procedure face mask.
3. Immediately prepare a private room with bathroom or designated commode (Remove all mobile carts & equipment before bringing patient in).
4. Ensure Droplet/Contact precaution signage and PPE supplies are in place STAT.
5. Walk patient to assigned room and keep them there until further notice.
6. Do not start routine IV, do not draw blood (phlebotomy, finger prick) for diagnostic testing, or do any aerosol generating treatments.
7. Exit room and perform hand hygiene.
8. Complete a risk assessment to determine what level of PPE is required.
9. If risk level is high, follow steps outlined in PPE Donning for High Risk Encounter and PPE Doffing for High Risk Encounter. A Trained Observer must be available to assist.
10. If a facility transfer to either Regina General Hospital or St. Paul's Hospital in Saskatoon is required, discuss move with Infection Control/Senior Leadership to plan a route with least amount of contact to others. Inform EMS Dispatch Centre and receiving facility staff ASAP.

1. **Viral hemorrhagic fever (VHF):** Includes Ebola virus disease, Marburg virus disease and Lassa fever for the purposes of this document
2. **Widespread transmission of Ebola virus disease is occurring in Guinea, Liberia and Sierra Leone.** For up-to-date information see WHO outbreak news at http://www.who.int/csr/don/archive/disease/ebola/en/
3. **VHF endemic countries:**
   Ebola virus disease: Western, Central and Eastern Africa; outbreaks have occurred in Guinea, Liberia, Nigeria and Sierra Leone, Democratic Republic of Congo, Sudan, Uganda, Gabon, Republic of Congo, Cote d'Ivoire.
   Marburg virus disease: Central and Eastern Africa; outbreaks have occurred in Angola, Democratic Republic of Congo, Republic of Congo, Kenya, Uganda, Zimbabwe.
   Lassa fever: Western and Central Africa, in particular Guinea, Liberia, Nigeria and Sierra Leone.
4. **Other signs and symptoms of VHF include:** headache, joint and muscle aches, abdominal pain, weakness, diarrhea, vomiting, lack of appetite, rash, red eyes, hiccoughs, cough, chest pain, difficulty breathing, difficulty swallowing, bleeding inside or outside the body
5. **Infectious Disease Physician on call:** request ID consult as per usual referral patterns through:
   Regina General Hospital switchboard (306) 766-4444 OR
   Royal University Hospital switchboard (306) 655-1000

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Infection Prevention and Control Measures for Initial Management of Persons Suspected to Have Ebola or Viral Hemorrhagic Fever (VHF)[1]

Intended for use in Emergency Departments and Inpatient Care Settings

Always follow Routine Practices including a Point of Care Risk Assessment

Screening, Assessment

Travel History:
within the last 3 weeks (21 days) the person has returned from or resided in areas where Ebola/VHF is active[2] or endemic

AND

Fever or a history of acute fever

- **Triage suspected patients as per Ebola Flow Map document**
- **Place and restrict patient to a single room with private bathroom or dedicated commode, with door closed**
- **Initiate appropriate Droplet and Contact Precautions and ensure Droplet/Contact Signage is posted** (hand hygiene, gloves, fluid resistant disposable gown, full face shield, surgical or procedure mask)
- **Avoid starting routine IVs or drawing blood** until I.D. assessment
- **Avoid Aerosol Generating Medical Procedures (AGMPs)** [3]
- **Assess need for Additional PPE in case of high risk symptoms or high risk procedures** (i.e., vomiting, or diarrhea , or bleeding OR AGMPs or procedures where body fluid contamination is likely) **Upgrade PPE as per Risk Assessment tool:** N95 Respirator, surgical head cover, impervious gowns, surgical boot covers, double gloving. For medically necessary AGMPs, follow your facility's protocol for Airborne and Contact Precautions.
- **Only essential hospital personnel and visitors essential to assist with patient care should enter the room.**
- **Provide education on hand hygiene and PPE and monitor the correct/consistent use of PPE for all who enter or leave the room**

Additional Considerations

- **Use an Airborne infection isolation room (AIIR) IF available, or an appropriate space for consistent control over access, PPE donning and removal process and safe management of used supplies and waste.**
- **Maintain a log book of persons entering the room or having patient contact**
- **Clean/disinfect environmental surfaces and non-critical reusable equipment according to the manufacturer's instructions with a product that is approved by Infection Control, has a broad spectrum virucide claim and a Drug Identification Number (DIN). Assess need for additional or more frequent cleaning measures when environmental soiling has occurred**
- **Waste should be contained at point-of-use, using leak-proof waste bags and covered bins.**
- **Soiled linens should be placed in clearly-labelled leak proof bags at the point-of-use and managed safely as per routine protocols or quarantined safely until diagnosis is confirmed**
- **Inform other departments (e.g., Laboratory, X-ray, Diagnostic imagining, ICU, bed management), facilities and ambulance dispatch if diagnostic tests are ordered or transfers are planned**

1. **Viral hemorrhagic fever (VHF):** Examples of VHF viruses include Ebola Virus Disease, Marburg virus hemorrhagic fevers and Lassa fever.
2. **VHF affected countries:** For updates and travel advisories go to: http://www.phac-aspc.gc.ca/tmp-pmv/pub-eng.php
   Ebola viral disease is endemic in Western, Central and Eastern Africa; areas currently affected by Ebola outbreaks are Guinea, Liberia and Sierra Leone.
   Marburg viral disease is endemic in Central and Eastern Africa; outbreaks have occurred in Angola, Democratic Republic of Congo, Republic of Congo, Kenya, Uganda, Zimbabwe.
   Lassa fever is endemic in Western and Central Africa, in particular Guinea, Liberia, Nigeria and Sierra Leone.
3. **Aerosol Generating Medical Procedure (AGMP):** Intubation and related procedures, cardiopulmonary resuscitation, bronchoscopy, sputum induction, nebulized therapy, non-invasive positive pressure ventilation.

Patient care considerations

- **Patient accommodation:**
  - Single room with private bathroom or dedicated commode; door remains closed
  - If available, an airborne infection isolation room (AIIR) with anteroom for donning and removing PPE is preferred
- **Limit use of needles and other sharps**
- **No phlebotomy or lab tests**
  - Unless cleared by MHO or ID physician
- **Avoid aerosol-generating medical procedures**
  - If possible
- **Ensure Level 4 precautions signage is posted**

Level 4 Precautions

If patient meets the travel and clinical criteria on the Ebola/VHR Flow Map, all staff are required to complete a Risk Assessment to determine Level of PPE required before providing further care. Visitors must be authorized by staff and instructed on PPE requirements to enter room

Symptoms and/or Patient Care Activities	LOW RISK No *High Risk Symptoms Present* AND No *High Risk Procedure Planned*	HIGH RISK *High Risk Symptoms* present and/or *High Risk Procedure* Planned
Boot Cover	Not required	✓FLUID RESISTANT
Level 4 Surgical gown with knitted cuffs	✓YES	✓YES
Fluid Resistant Hood	Not required	✓YES
Mask or Respirator Type	✓Surgical/Procedure Mask	✓ N95 RESPIRATOR
Full Face Shield	✓YES	✓YES
Nitrile Gloves	✓YES	✓Use double gloves Extended cuff model for 2nd outer pair

- **HIGH RISK SYMPTOMS include**: bleeding OR uncontrolled diarrhea OR uncontrolled vomiting.
- **HIGH RISK PROCEDURES include:** cardiopulmonary resuscitation, central line insertion, AGMPs, any procedures that result in large amounts of body fluid contamination.
- **AGMP (aerosol generating medical procedures) include:** intubation, and related procedures, open respiratory/airway suctioning, high- frequency oscillatory ventilation, nebulized therapy, non-invasive, positive pressure ventilation.

The decision to upgrade to a higher level of protection than suggested is based on your assessment of risk in each situation.

Patient Placement: ✓ Single room with private bathroom or dedicated commode *at minimum.* ✓ Airborne Infection Isolation Room (AIIR) *if available.* ✓Restrict patient to room. ✓Door to remain closed.

Limit patient contacts: ✓Only essential hospital personnel and visitors essential to assist with patient care should enter room. ✓All who enter must use Personal Protective Equipment (PPE) listed above.

Monitoring: ✓Maintain a log of persons entering room or having patient contact. ✓A trained observer should be available to monitor appropriate donning and doffing of PPE for all who enter or leave the room.

Environmental Considerations: ✓Only use an Infection Control approved hospital grade disinfectant. ✓Ensure environmental surfaces and non-critical patient care equipment is cleaned regularly. If soiling occurs, increase cleaning frequency. ✓Disposable or dedicated patient care equipment is recommended. ✓Do not bring in patient chart or store non-essential supplies in patient room.

Additional considerations

- Restrict access to those absolutely essential for patient care
- Ensure education on hand hygiene and appropriate level of PPE is provided
- Restrict patient to room. For transfer, cover patient with a sheet and have them wear a procedure mask at all times.
- Maintain a log of **all persons** entering patient's room
- Use **disposable medical equipment if possible** or use client dedicated equipment that is meticulously cleaned and disinfected before re-use

IPAC Practices for suspected EVD/VHF: Enhanced Droplet + Contact Precautions

Complete a risk assessment to determine what level of PPE is required

- **If risk is low, follow steps outlined in PPE Donning and Doffing for Low Risk Encounter**
- **If risk level is high, follow steps outlined in PPE Donning and Doffing for High Risk Encounter. A trained observer must be available to assist and complete the trained observer checklist.**
- **The trained observer checklists for donning and doffing PPE for high risk encounters can be found at:**
  http://www.health.gov.sk.ca/ebola

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Ebola Risk Assessment[1] & Level of PPE

Transmission of Ebola virus occurs when non-intact skin or mucous membranes have direct or indirect contact with blood or body fluids of an infected person. Appropriate Infection Control measures like Environmental Cleaning[2], Waste Management and proper use and removal of Personal Protective Equipment (PPE) are essential for safe practice.

Trained observers are required to monitor PPE donning and doffing steps when patient symptoms and/or care activities are determined to be a potential High Risk. The decision to upgrade to a higher level of protection, is based on your assessment of risk in each situation

Risk of Ebola and Symptoms or Patient Care Activities	Routine practices as for all patients	Nitrile Gloves Fluid resistant Mask Level 4 fluid resistant gown with knitted cuffs or thumb loops Full face shield	Increase PPE level to: N95 Respirator, Fluid resistant head cover, Double gloves, impervious boot covers
Patient is being monitored by Public Health for potential Ebola symptoms, but has no symptoms[3] (no symptoms = no risk)	YES	NO	NO
Patient meets Travel criteria[4] for suspected Ebola – Low Risk Symptoms present acute fever (> 38°C), headache, joint and muscle aches, weakness, abdominal pain	YES	YES	NO
Patient meets travel criteria[4] for suspected Ebola - High Risk Symptoms present[5] bleeding, or diarrhea or vomiting and/or a High risk procedure[6,7] is required Central line insertion, procedures that result in copious amounts of body fluid contamination. AGMPs[6], CPR	YES	YES	YES

[1]See Level 4 Precaution Signage for additional information on Inpatient or longer term patient management
[2]Use an Infection Control approved hospital grade disinfectant: a broad spectrum virucide product or proven efficacy against Adenovirus type 5, Bovine Parvovirus, Canine Parvovirus and Poliovirus types 1.
[3]Symptoms of Ebola Virus Disease include: acute fever (> 38°C), headache, joint and muscle aches, abdominal pain, weakness, diarrhea, vomiting, lack of appetite, rash red eyes, hiccoughs, cough, chest pain, difficulty breathing, difficulty swallowing, bleeding inside or outside of the body
[4]Refer to Ebola/Viral Hemorrhagic Fever Initial Clinical Assessment and Management Flow Map
[5]Examples of high risk symptoms include: bleeding, diarrhea or vomiting
[6]AGMP (aerosol generating medical procedures) include: intubation, and related procedures, open respiratory/airway suctioning, high-frequency oscillatory ventilation, nebulized therapy, non-invasive, positive pressure ventilation
[7]High Risk Procedures include: cardiopulmonary resuscitation, central line insertion, procedures that result in copious amounts of body fluid contamination

Donning and Doffing PPE

- **With anteroom:** **Remove and dispose of PPE in anteroom**
- **Without anteroom:** **Remove and dispose of PPE inside the doorway when exiting the room (except for N95 respirator)**
- For high risk encounters, a trained observer must be present to **observe** the application and removal of PPE, to ensure unexpected contamination does not occur
- Carefully remove PPE going from the **most to least contaminated**, performing hand hygiene before touching your face and any time hand soiling occurs

When Wearing PPE

- Avoid touching or adjusting PPE
- Remove gloves if they become torn or damaged
- Perform hand hygiene before donning new gloves
- Avoid touching your eyes, mouth or face with gloved or ungloved hands

LOW RISK* DONNING Personal Protective Equipment (PPE)

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*Low Risk – Encounter with a patient suspected to have Ebola Virus Disease who is mildly symptomatic: mild fever, fatigue, headache, sore throat, muscle pain.

The decision to upgrade to a higher level of protection is based on your assessment of risk in each patient care situation. If risk is high, use the high risk protocol.

The use of a trained observer is not required for a low risk encounter; however, HCWs are encouraged to request assistance, if needed. The trained observer checklist for donning PPE is not required for a low risk encounter.

Ensure you are signed into the log book prior to entering patient room.

Move slowly; do not rush, when putting on PPE before entering the patient room.

1. Hand hygiene	
	• Perform hand hygiene • Alcohol-based hand rub (ABHR) is preferred • Soap and water is used when hands are visibly soiled
2. Surgical gown	**Gown should be rated as Level 4 for moderate to high level of fluid resistance**
	• Gown is securely fastened at the neck, waist, and back using all Velcro/ties provided
3. Mask	**Fluid resistant surgical/procedure mask**
 	• Place mask over nose, mouth, and chin • Secure ties or loops • Adjust flexible nose piece over the bridge of your nose using both hands

LOW RISK* DONNING Personal Protective Equipment (PPE)

4. Full face shield	
	• Place face shield over the mask and prescription glasses if wearing • Adjust strap to ensure good fit
5. Nitrile gloves	Single glove provides adequate protection for low risk encounter
	• Either regular length or extended length nitrile gloves • Pull gloves over the cuffs of the gown • Inspect for tears
6. While wearing PPE	• Avoid touching your face or adjusting PPE once in the client care environment • Minimize contact with contaminated environmental surfaces • Should the risk encounter change while providing patient care, the HCW should leave the patient area, safely remove all personal protective equipment, and begin using the high risk protocol for further patient encounters

Trained Observer: DONNING Personal Protective Equipment

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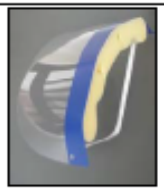
The Trained Observer (TO) is a dedicated individual with the sole responsibility of ensuring adherence to the entire High Risk donning doffing process as well as monitoring for possible exposures during care. The TO should not enter the room of a patient with Ebola, but remain in the PPE removal area to observe safe practice during care delivery and assist with and guide the removal of PPE.

The TO should be:

- knowledgeable about all PPE recommended by the facility's protocol, provide guidance and instruction to HCWs on the correct donning and doffing procedures as well as the proper disposal of used PPE
- responsible to provide immediate corrective instruction if the HCW is not following the recommended steps of donning and doffing procedures
- responsible to be provide guidance on the care/management protocol should an unintentional exposure occur during patient care

1. Hand hygiene	
	• Perform hand hygiene • Alcohol-based hand rub (ABHR) is preferred • Soap and water is used when hands are visibly soiled
2. Surgical gown	**Gown should be rated as Level 4 for moderate to high level of fluid resistance**
	• Gown is securely fastened at the neck, waist, and back using all Velcro/ties provided
3. Shoe covers	**Fluid resistant shoe covers**
	• Support yourself against a clean surface or sit down to apply shoe covers, toe first followed by heel • Avoid touching the bottom of shoes with clean hands

Trained Observer: DONNING Personal Protective Equipment

4. Full face shield	
	• Place face shield prescription glasses if wearing • Adjust strap to ensure good fit so that entire face and eyes are covered
5. Extended length nitrile gloves	**One glove layer provides adequate protection for non-patient encounters**
	• Extended length nitrile gloves • Pull gloves over the cuffs of the gown • Inspect for tears
6. *When to Don PPE	• The physical environment and standard work of your facility will determine when the TO needs to don their PPE • The HCW is considered clean before entering the patient's room so the TO would not be required to be wearing PPE for the HCW donning process • The TO would be required to have their PPE on before the HCW enters the patient's room. This will ensure the TO is ready to monitor HCW safety while providing care and to be available for doffing assistance if the HCW needs to leave the room urgently.

HIGH RISK* DONNING Personal Protective Equipment (PPE)

***High risk:**
Patient is confirmed to have Ebola Virus Disease
OR
Patient is suspected to have Ebola Virus Disease
AND

- has high risk symptoms such as bleeding or uncontrolled diarrhea or uncontrolled vomiting; or
- is unstable and requires a high risk procedure such as an aerosol generating medical procedure (includes intubation, open respiratory/airway suctioning, high-frequency oscillatory ventilation, nebulized therapy, non-invasive positive pressure ventilation), cardiopulmonary resuscitation, central line insertion, or any procedure that could potentially result in copious amounts of body fluid generation or exposure

PPE Storage and Donning Area

- An area outside of the patient room (e.g., nearby vacant patient room or a marked area in the hallway outside the patient room) where clean PPE is stored and where healthcare workers (HCW) can don PPE under the guidance of a trained observer before entering the patient room
- Post appropriate signage indicating room designation and purpose

Pre-Donning Activities

- Ensure that all required personal protective equipment and supplies are available and in the size required for the healthcare worker
- Ensure you are signed into log book
- Remove all personal items (i.e. jewelry, watches, cell phones, lanyards, pagers, pens)
- Ensure longer hair is tied back
- Remove personal clothing and change into scrubs and dedicated washable shoes (fluid resistant footwear-closed toe and heels, plastic or rubber soles)
- Hydrate (no drinking or eating is allowed in patient care area)
- Ensure trained observer is available to monitor, assist (if required), and document the steps of the donning checklist with you
- Ensure trained observer document the steps of the donning checklist with you

Trained observer PPE

- The trained observer will don surgical gown, shoe covers, face shield, and gloves

If using the high risk PPE donning protocol, you <u>must</u> ensure that a trained observer is present to monitor PPE donning and to document the steps on the PPE donning checklist

Move slowly; do not rush, when putting on PPE before entering the patient room

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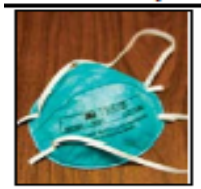
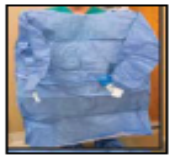
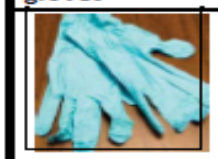
HIGH RISK* DONNING Personal Protective Equipment (PPE)

1. Hand hygiene	
	• Perform hand hygiene • Alcohol-based hand rub (ABHR) is preferred • Soap and water is used when hands are visibly soiled
2. Knee high boot covers	
	• Sit on a clean chair, if available • Place boot cover on toes of foot and pull up
3. Hand hygiene	
	• Perform hand hygiene • Alcohol-based hand rub (ABHR) is preferred • Soap and water is used when hands are visibly soiled
4. N95 respirator	Use your appropriate fit-tested size
	• Place over nose, mouth and chin • Flexible nose piece is fitted over bridge of nose • Secure on head with elastics: bottom elastic first at the base of the neck, then top elastic at the crown of your head • Perform a seal-check
5. Nitrile gloves	
	• Either regular length or extended length nitrile gloves • First set of gloves worn under gown cuffs • Inspect for tears

HIGH RISK* DONNING Personal Protective Equipment (PPE)

6. Surgical gown	**Gown should be rated as Level 4 for moderate to high level of fluid resistance**
	• Ensure gown is large enough to allow unrestricted movement • Gown is securely fastened at the neck, waist, and back using all Velcro/ties provided • Trained observer may assist with ties, if required • Ensure inner gloves are tucked under the sleeve of the gown
7. Apron (if used)	If additional protection against copious body fluids is required
8. Surgical Hood	
	• Ensure hood fits overs the N95 respirator and glasses if wearing • Hood should cover all of the hair and the ears, and extends past the neck to the shoulders • Trained observer will check that hood completely covers the ears and neck
9. Full face shield	
	• Place face shield over the N95 respirator and surgical hood • Adjust to fit • Ensure there is an overlap to protect the forehead
10. Extended cuff nitrile gloves	
	• Second set of gloves worn over gown cuffs • Inspect for tears
11. Inspection	
	• Trained observer inspects PPE for gaps and adjusts if necessary • Conduct range of motion activities (e.g., move your arms, legs and neck) to ensure PPE stays intact. The goal is for the PPE to be secure and the staff care provider to be comfortable • Avoid touching your face or adjusting PPE once in the patient care environment

Doffing PPE

- Remove PPE going from the most contaminated to least contaminated
- Remove PPE carefully
  - Avoid any contact between the soiled items (gowns and gloves) and any area of the face (eyes, nose or mouth) or areas of non-intact skin
- Discard PPE appropriately into no touch waste container

LOW RISK* DOFFING Personal Protective Equipment (PPE)

*Low Risk – Encounter with a patient suspected to have Ebola Virus Disease who is mildly symptomatic: mild fever, fatigue, headache, sore throat, muscle pain.

The use of a trained observer is not required for a low risk encounter; however, HCWs are encouraged to request assistance, if needed. The trained observer checklist for doffing PPE is not required for a low risk encounter.

Personal protective equipment should be removed in a designated doffing area (e.g., anteroom or in patient's room near the door) and discarded into an appropriate waste receptacle.

Remove personal protective equipment slowly and carefully.

1. Disinfect gloves	• Clean gloves using a hospital grade disinfectant wipe before touching the door handle
2. Inspect	• Inspect PPE for visible contamination or tears • Remove any obvious contamination with a hospital grade disinfectant wipe
3. Remove gloves 	• Grasp outside edge of glove near the wrist and peel away, rolling the glove inside out • Slide 1 or 2 fingers under the wrist of the remaining glove and peel away • Discard immediately into waste
4. Remove gown 	• Remove gown in a manner that prevents contamination of clothing and skin • Carefully unfasten ties • Slide 2 fingers under cuff of gown and pull hand into gown. Using the hand that is covered, grab the opposite sleeve of gown and pull away from body over hand. Continue folding the gown inward on to itself and rolling it away from you until it becomes small enough to discard • Place into waste receptacle

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LOW RISK* DOFFING Personal Protective Equipment (PPE)

5. Perform hand hygiene 	• Alcohol-based hand rub (ABHR) is preferred • Use soap and water if hands are visibly soiled
6. Remove face shield 	• The front of the face shield is considered contaminated • Handle only by the rear strap and pull it up and over the head gently, allowing the face shield to fall forward • Place in waste receptacle
7. Remove mask  	• Ties/straps are considered "clean" and may be touched with hands • Untie the bottom tie first, then the top <u>or</u> grasp straps with both hands • Pull forward off the head, bending forward to allow mask to fall away from face • Place in waste receptacle
8. Perform hand hygiene 	• Alcohol-based hand rub (ABHR) is preferred • Use soap and water if hands are visibly soiled

HIGH RISK* DOFFING Personal Protective Equipment (PPE)

***High risk:**
Patient is confirmed to have Ebola Virus Disease
OR
Patient is suspected to have Ebola Virus Disease
AND

- has high risk symptoms such as bleeding or uncontrolled diarrhea or uncontrolled vomiting; or
- is unstable and requires a high risk procedure such as an aerosol generating medical procedure (includes intubation, open respiratory/airway suctioning, high-frequency oscillatory ventilation, nebulized therapy, non-invasive positive pressure ventilation), cardiopulmonary resuscitation, central line insertion, or any procedure that could potentially result in copious amounts of body fluid generation or exposure

PPE Doffing Area

- Designate an area in close proximity to the patient room (e.g., anteroom or adjacent vacant room) that is separate from the clean area where healthcare workers (HCWs) leaving the patient's room can doff and discard their PPE
- Alternatively, some steps of the PPE removal process may be performed in a clearly designated area of the patient's room near the door, which ensures that all doffing steps can be seen and supervised by the trained observer (e.g., through a window so that the instructions of the trained observer can still be heard)
- Provide supplies for disinfection of PPE (hospital grade approved disinfectant wipes) and for hand hygiene
- Provide a space for sitting, parallel to the doffing pad, that can be easily cleaned and disinfected, where the HCW can remove boot covers
- Provide leak-proof infectious waste containers for discarding used PPE
- If a hallway is being used outside the patient room, construct physical barriers to close hallway to traffic (thereby creating an anteroom)
- Post appropriate signage indicating room designation and purpose

Pre-Doffing Activities (HCW)

- Ensure the trained observer is available to monitor, assist (where required), and document the steps of the PPE doffing checklist with you

Pre-Doffing Activities (trained observer)

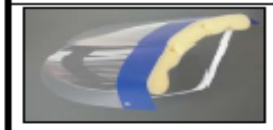
- Don shoe covers, gown, face shield, and gloves to assist HCW with removal of PPE
- Prepare a doffing pad that is marked section 1 and section 2 (or utilize a protocol that follows similar principles, adapted for your facility)
- Read aloud each step of the PPE doffing procedure to the HCW and provide reminders to avoid reflexive actions that may put them at risk, such as touching their face

PPE items shall be removed slowly and carefully and discarded one piece at a time in a hands-free waste receptacle

HIGH RISK* DOFFING Personal Protective Equipment (PPE)

1. Disinfect outer gloves	
	• Use a hospital grade disinfect wipe to clean outer gloves prior to opening the door to the patient room
2. Clean door handle	• Use a new hospital grade disinfectant wipe to clean the door handle before opening the door
3. Inspect	• HCW steps out of the patient room onto section 1 of the doffing pad • Trained observer visually inspects PPE for visible contamination or tears before doffing process is started • If any PPE appears contaminated, HCW will clean and disinfect area using a hospital grade disinfectant wipe
4. Remove outer gloves	
	• Minimize direct contact with inner gloves • Grasp outside edge of glove near the wrist and peel away, rolling the glove inside out • Slide 1 or 2 fingers under the wrist of the remaining glove and peel away • Discard immediately into waste receptacle
5. Disinfect inner glove	
	• Use a hospital grade disinfectant wipe to clean inner gloves
6. a Remove Apron (if used)	**Do Not Remove Over the Head**
	• Depending on the type of apron used, neck and/or waist straps will be either untied by TO or cut with scissors by TO • HCW will carefully fold the apron inward on to itself, rolling it away and into small bundle and place in waster receptacle • Both HCW and TO will use a hospital grade disinfectant to clean gloves
6.b Remove Gown	
	• Remove gown in a manner that prevents contamination of clothing and skin • Trained observer will carefully put gloved hand under the back of the hood to unfasten top tie first, then outside waist tie, then inside waist tie • HCW will slide 2 fingers under cuff of gown and pull hand into gown. Using the hand that is covered, grab the opposite sleeve of gown and pull away from body over hand. Continue folding the gown inward on to itself and rolling it away from you until it becomes small enough to discard • Place into waste receptacle

HIGH RISK* DOFFING Personal Protective Equipment (PPE)

7. Remove knee high boot covers	
	• Sit on a clean chair (if available) • Remove boot covers one at a time by rolling down and outward, lifting your heel first and then your toes • Step out of the boot covers one at a time onto section 2 of the doffing pad • Trained observer will discard boot covers into waste receptacle • <u>If chair is not available</u>, then the HCW will roll the top of the boot covers out and down. The trained observer can continue pulling the boot covers down and hold while the HCW steps on to section 2 of the doffing pad
8. Remove inner gloves	
	• Grasp outside edge of glove near the wrist and peel away, rolling the glove inside out • Slide 1 or 2 fingers under the wrist of the remaining glove and peel away • Discard immediately into waste receptacle
9. Perform hand hygiene	
	• Perform hand hygiene • Alcohol-based hand rub (ABHR) is preferred • Soap and water is used when hands are visibly soiled
10. Put on new gloves	• When hands are dry, put on a new pair of gloves
11. Remove face shield	
	• The front of the face shield is considered contaminated • Handle only by the rear strap and pull it up and over the head gently, allowing the face shield to fall forward • Place in waste receptacle

12. Remove gloves	
	• Grasp outside edge of glove near the wrist and peel away, rolling the glove inside out • Slide 1 or 2 fingers under the wrist of the remaining glove and peel away • Discard immediately into waste receptacle
13. Perform hand hygiene	
	• Perform hand hygiene • Alcohol-based hand rub (ABHR) is preferred • Soap and water is used when hands are visibly soiled
14. Put on new gloves	• When hands are dry, put on a new pair of gloves
15. Remove surgical hood	
	**Option 1:** •Grasp the top point of the surgical hood with dominant hand and the bottom middle of hood with non-dominant hand • Bend head slightly forward, close your eyes • Pull hood forward and off your head in a slow controlled motion, (Non-dominant hand to assist hood over N95 respirator) • Place hood carefully in waste receptacle **Option 2:** for a tighter fit or concern about contamination • TO will use scissors to make a lateral cut to the hood up to facial opening - being very careful not to harm HCW's face • HCW will grasp the top of the hood, opposite to the side where the hood was cut and pulls the hood up and off the head. • Place hood carefully in waste receptacle
16. Remove gloves	Both HCW and TO follow 16 &17 if Option 2 hood removal used
	• Grasp outside edge of glove near the wrist and peel away, rolling the glove inside out • Slide 1 or 2 fingers under the wrist of the remaining glove and peel away • Discard immediately into waste receptacle
17. Perform hand hygiene	
	• Perform hand hygiene • Alcohol-based hand rub (ABHR) is preferred • Soap and water is used when hands are visibly soiled

HIGH RISK* DOFFING Personal Protective Equipment (PPE)

18. Remove N95 respirator	
	• The front of the respirator is considered contaminated • Lift the bottom elastic over your head first, then the top elastic up and over your head • Pull forward off the head bending forward to allow respirator to fall away from the face • Place respirator carefully into waste receptacle

19. Perform hand hygiene	
	• Perform hand hygiene • Alcohol-based hand rub (ABHR) is preferred • Soap and water is used when hands are visibly soiled
20. Put on new gloves	• When hands are dry, put on a new pair of gloves
21. Clean shoes	• If a second chair is available, HCW may sit and clean the tops, sides, and bottoms of each shoe using hospital grade disinfectant wipes (use one wipe for each shoe) • If a second chair is not available, the trained observer will wipe the top, sides, and bottoms of each shoe • As each shoe is cleaned, the HCW steps off the doffing pad on to the floor
22. Remove doffing pad	• Trained observer rolls up doffing pad and places in waste receptacle
23. Remove gloves	
	• Grasp outside edge of glove near the wrist and peel away, rolling the glove inside out • Slide 1 or 2 fingers under the wrist of the remaining glove and peel away • Discard immediately into waste receptacle
24. Perform hand hygiene	
	• Perform hand hygiene • Alcohol-based hand rub (ABHR) is preferred • Soap and water is used when hands are visibly soiled

Trained Observer: DOFFING Personal Protective Equipment (PPE)

The Trained Observer (TO) will remove PPE in the same sequence as the healthcare worker but without assistance unless the TO has difficulty untying the Level 4 gown or has obvious contamination on their PPE (see Pre-Doffing activities).

PPE Doffing Area

- As per the High Risk Doffing document: a designated area in close proximity to the patient room (e.g., anteroom or adjacent vacant room) that is separate from the clean area where healthcare workers (HCWs) leaving the patient's room can doff and discard their PPE
- Provide a space for sitting, parallel to the doffing pad, that can be easily cleaned and disinfected, where the TO can remove shoe covers
- Provide leak-proof infectious waste containers for discarding used PPE
- If a hallway is being used outside the patient room, construct physical barriers to close hallway to traffic (thereby creating an anteroom)
- Post appropriate signage indicating room designation and purpose

Pre-Doffing Activities (TO)

- Ensure no HCWs are providing inpatient care that requires monitoring
  Or, another TO is ready and available to replace you.
- If obvious contamination is present on TO's PPE, then there must be a TO to guide assist if necessary in the removal of their PPE.
- Step 1 starts with a gloved scenario: the TO has either removed the doffing pad, removed gloves, performed Hand hygiene and has put on a new pair of extended nitrile gloves
  Or has on a pair of nitrile gloves as part of their required PPE while monitoring the HCW from the Doffing area.

Post-Doffing Activities (TO)

- Sign out of area as per facility protocol.
- If shift is finished remove any additional under garments that may be required as per facility protocols.

PPE items shall be removed slowly and carefully and discarded one piece at a time in a hands-free waste receptacle

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Trained Observer: DOFFING Personal Protective Equipment (PPE)

1. Disinfect gloves	*Only required if gloves have been used for other activities in the doffing area
	• Use a hospital grade disinfect wipe to clean gloves prior to doffing activities
2. Remove shoe covers	
	• Sit in the clean chair if available or work from standing positon • Slowly remove your shoe covers one at a time, minimizing contact with the bottom of the shoe. • Roll the shoe cover back and off, from the heel area, so that the inside of the shoe cover is on the outside during final removal into the waste receptacle. • Discard immediately into waste receptacle
5. Remove gloves	
	• Grasp outside edge of glove near the wrist and peel away, rolling the glove inside out • Slide 1 or 2 fingers under the wrist of the remaining glove and peel away • Discard immediately into waste receptacle
6. Perform hand hygiene	
	• Perform hand hygiene • Alcohol-based hand rub (ABHR) is preferred • Soap and water is used when hands are visibly soiled
6. Remove Gown	
	• Untie the neck, outer back waist and inner waist. If this is difficult to reach arrange to have assistance from another HCW who has on gloves and will not be in contact with other pieces of your PPE • Remove gown in a manner that prevents contamination of clothing and skin. TO will slide 2 fingers under cuff of gown and pull hand into gown. Using the hand that is covered, grab the opposite sleeve of gown and pull away from body over hand. Continue folding the gown inward on to itself and rolling it away from you until it becomes small enough to discard • Place into waste receptacle

Trained Observer: DOFFING Personal Protective Equipment (PPE)

7. Perform hand hygiene	
	• Perform hand hygiene • Alcohol-based hand rub (ABHR) is preferred • Soap and water is used when hands are visibly soiled
8. Remove face shield	
	• The front of the face shield is considered contaminated • Handle only by the rear strap and pull it up and over the head gently, allowing the face shield to fall forward • Place in waste receptacle
9. Perform hand hygiene	
	Perform hand hygiene • Alcohol-based hand rub (ABHR) is preferred • Soap and water is used when hands are visibly soiled

A Clean Environment will Reduce Disease Transmission

- All Environmental staff must wear PPE as described in the Risk Assessment tool
- Product used for cleaning/disinfection must have a broad spectrum virucidal claim (proven effective against non-enveloped viruses like Norovirus or Polio)
- Additional or more frequent cleaning should be based on the level of contamination with blood and/or body fluids
- Housekeeping equipment should be disposable or remain in the room

Environmental Considerations

- **Waste/Garbage:** contain at point of use in leak proof bags and covered bins
- **Biomedical Waste:** manage and dispose of according to local guidelines
- **Linens:** Soiled linen should be placed in a no-touch receptacle at the point-of-use
  - handle with minimum agitation to avoid contamination of air, surfaces and persons
  - heavily soiled linen should be discarded into a no touch garbage receptacle at the point-of-use.
- **The outside of all containers must be wiped down** with cleaner/disinfectant before removal from room

Waste Management for Suspected VHF Patients

- **If patient is continent** and able to use the toilet, patient waste can be flushed directly.
- **If patient is unable to use the toilet**, patient waste can be disposed of:
  - In a automated waste disposal system (if available)
  - By using a solidifier and dispose of patient waste in a biomedical waste container
- Consider placing all garbage, waste and non-disposable linens in sealed double bags that are **clearly labelled and safely quarantined until a final diagnosis is made**.
- If VHF is ruled out, manage waste and linens as per routine practices

Waste Management for Confirmed VHF Patients

- **Patient waste;**
  - Use products that solidify waste and place in biomedical waste container
  - With approval of local water authority, flush liquid waste (vomit, diarrhea) into local sewer.
  - If not approved, liquid waste must be treated prior to flushing. See following link:

    http://www.cdc.gov/vhf/ebola/prevention/faq-untreated-sewage.html

- **All waste (biomedical, laundry, garbage) generated during patient care** must be disposed of into designated Biomedical waste containers and cardboard boxes as supplied by Biomed Recovery and Disposal Ltd.

References for 2016 Revision

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2. Van Beneden C, Pietz H, Kirkcaldy R, et al. **"Early Identification and Prevention of the Spread of Ebola – United States."** MMWR Suppl 2016;65(No. 3):[75-84]. [cited August 19, 2016]; Available from: http://www.cdc.gov/mmwr/volumes/65/su/pdfs/su6503.pdf

2. Boundless. "Classic Viral Hemorrhagic Fevers." *Boundless Microbiology*. Boundless, 26 May. 2016. Retrieved 19 August from https://www.boundless.com/microbiology/textbooks/boundless-microbiology-textbook/diseases-15/viral-diseases-of-the-cardiovascular-and-lymphatic-systems-175/classic-viral-hemorrhagic-fevers-878-7351

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2. **Public Health Agency of Canada (PHAC)**: Ebola Virus Disease Web page. See Health Professionals and Infection Prevention and Control Sections.* http://healthycanadians.gc.ca/diseases-conditions-maladies-affections/disease-maladie/ebola/professionals-professionnels/index-eng.php
3. **World Health Organization (WHO):** Interim Infection Control Guidance for Care of Patients with suspected or Confirmed Filovirus Haemorrhagic Fever in Health Care Settings, with Focus on Ebola. August 2014. [cited October 2014]; Available from http://www.who.int/csr/resources/publications/who-ipc-guidance-ebolafinal-09082014.pdf
4. **"Key Measures for Prevention and control Ebola Virus Disease",** A Webber Training Teleclass presented by Dr. Sergey Eremin, WHO Department of Pandemic and Epidemic Diseases , Sept 16, 2014.
5. **Albert Health Services: Ebola Virus Disease Transmission, November 5, 2014** http://www.albertahealthservices.ca/assets/info/hp/diseases/if-hp-dis-ebola-evd-transmission.pdf
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7. **Centre for Disease Control and Prevention : Ebola (Ebola Virus Disease).*** http://www.cdc.gov/vhf/ebola/

***Denotes website reference has been deleted or totally changed since original citation**

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