Ebola Virus Disease (EVD)

December 2014

Capital Health

Infection Prevention and Control

Key Facts

- Ebola virus disease (EVD) is a severe, and can be a fatal illness in humans.
- EVD outbreaks have had an average case fatality rate of 50%. Case fatality have varied from 25 to 90% in past outbreaks. (WHO, December 2014)
- EVD outbreaks occur primarily in remote villages in Central and West Africa, near tropical rain forests. The current outbreak of EVD is in West Africa.
- There are currently no licensed Ebola vaccines but 2 potential candidates are undergoing evaluation.
- There have never been any cases in Canada.

What causes Ebola?

- It is not known exactly how humans first become infected with the Ebola virus.
- Recent evidence suggests that humans may initially get the virus through contact with infected animals (bats, monkeys, gorillas, pigs, etc).
- Once the virus is transmitted to people from wild animals, it spreads in the human population through human-to-human transmission.

How is Ebola Spread?

- The virus can spread through direct contact (through broken skin or mucus membranes) with blood, body fluids, secretions, or excretions of an infected person or animal (or meat of an infected animal).
- Ebola can also be spread through contact with environmental surfaces and materials contaminated with infected body fluids such as needles, soiled linens,etc.
- There is no evidence that EVD is spread by the airborne route.
- Ebola is not spread during casual contact.

What are the risks of getting Ebola?

- As long as precautions are taken, there is a low risk of contracting EVD in a country where the disease is present.

- Where the virus is present, people who have close contact with infected humans are most at risk. This includes laboratory workers, hospital staff, family members caring for patients.

- **Healthcare workers caring for patients with suspected or confirmed EVD must carefully & consistently apply the recommended infection control precautions.**

Symptoms

- People are **contagious** once they begin to show symptoms. They are not contagious during the incubation period.
- Symptoms can begin 2 to 21 days after exposure.
- **Initial** symptoms include sudden onset of **fever AND** any **one** of the following:

Sore throat	**Chills**	**Muscle pain and weakness**
Abdominal pain	**Headache**	**Malaise**

Additional (later) symptoms may include:

Vomiting	Diarrhea that can be Bloody
Erythematous Maculopapular rash on trunk	Conjunctival injection (red Eyes)
Unexplained bleeding from gums, nose, injection sites, and the gastrointestinal (GI) tract occurs in about 50% of cases. Often occurs in the later stages of the disease	

The symptoms of EVD are not specific and are difficult to differentiate from other endemic or epidemic tropical diseases such as malaria, typhoid fever.

Clinical Manifestations by Organ System in West African Ebola Outbreak

Organ System	Clinical Manifestation
General	Fever (87%), fatigue (76%), arthralgia (39%), myalgia (39%)
Neurological	Headache (53%), confusion (13%), eye pain (8%), coma (6%)
Cardiovascular	Chest pain (37%),
Pulmonary	Cough (30%), dyspnea (23%), sore throat (22%), hiccups (11%)
Gastrointestinal	Vomiting (68%), diarrhea (66%), anorexia (65%), abdominal pain (44%), dysphagia (33%), jaundice (10%)
Hematological	Any unexplained bleeding (18%), melena/hematochezia (6%), hematemesis (4%), vaginal bleeding (3%), gingival bleeding (2%), hemoptysis (2%), epistaxis (2%), bleeding at injection site (2%), hematuria (1%), petechiae/ecchymoses (1%)
Integumentary	Conjunctivitis (21%), rash (6%)

WHO Ebola Response team. *NEJM*. 2014

How is Ebola diagnosed?

- Ebola is diagnosed based on travel history, symptoms and laboratory testing.

- Health care workers should be on the lookout for patients presenting with EVD compatible symptoms who within **21** days of illness have **travelled from:**
    - **Sierra Leone**
    - **Liberia**
    - **Guinea**

Diagnosis (con't)

- Has been in **contact with ill individual(s) who has developed symptoms of EVD within 21 days of travel** to an Ebola area
- Has been exposed to bats, rodents, or primates from disease-endemic areas or laboratories that handle Ebola viruses.
- For more Screening Information see: ***Screening and Management of Patients with Suspected Ebola Virus Disease*** ***(located on IPAC website)***

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Screening and Management of Patients with Suspected Ebola Virus Disease (EVD) in Emergency Rooms

Sudden onset of fever AND at least one of the following additional signs & symptoms:

- Malaise (weakness)
- Myalgia(muscle pain)
- Headache
- Abdominal Pain
- Vomiting
- Diarrhea; with or without blood
- Pharyngitis (sore throat)
- Conjunctival injection (red eyes)
- Macular/petechial rash on trunk
- Unexplained bleeding /hemorrhage

Link to NS Case definition for EVD

Yes

Within 21 days of onset of illness the patient has:

- **Travelled from** a specific areas of a country where an outbreak of EVD has recently occurred (Outbreaks have been declared in **Sierra Leone, Liberia, Guinea, Democratic Republic of Congo or**
- Had contact with ill individual(s) who has developed symptoms of EVD **or**
- Been exposed to bats, rodents, or primates from disease-endemic areas or laboratories that handle Ebola viruses.

Clinicians can find additional information in the Nova Scotia Department of Health and Wellness'
EVD Standardized Triage Screening Tool

Yes

- Once affirming symptoms & travel: stop interview and ask patient to don mask and clean hands. Patients with suspected or confirmed EVD should be **immediately placed** in **a private room with its own washroom. Use dedicated commode with waste management bags, in absence of washroom.** Remove unnecessary supplies/equipment from room, prior to placing patient in room. After in room, mask may be removed by patient, if no presentation of respiratory symptoms; based on your risk assessment.
- **Notify**: Physician must call **The Medical Officer of Health (MOH)** at 902-481-5800 (or after hours through locating at 902-473-2220; ask for MOH on call). Delegated department person to make internal CDHA notification as per EVD Communications protocol.
- **Avoid unnecessary direct contact with patient**. Cordon off area patient has used and notify housekeeping for an Ebola clean.
- **Initiate Contact and Droplet Precautions,** in addition to **Routine Practices.**
- **Level of PPE required, is determined by your Point of Care Risk Assessment, based on patient's clinical status.**
  - Use at least: **Impermeable or fluid resistant blue gowns, nitrile gloves, surgical mask and eye protection (face shield)** when caring for patient with suspected or confirmed to have EVD.
  - Use **Enhanced PPE** (**impermeable disposable boot/leg covers, head/neck covering, double gloves)** if there is a high risk of heavy exposure to blood and /or body fluids. This is based on the Point of Care Risk Assessment.)
  - **Aerosol generating medical procedures** (I.e. intubation, open airway suction, bronchoscopy) should be performed in **airborne isolation rooms** and only if medically necessary. The number of healthcare workers present should be limited during these procedures and a respirator (N95) mask should be worn in addition to other PPE. See Best Practice Guidelines for Management of Patient with EVD.
- **Post additional personnel at door(s) of isolation room** to observe/assist with proper removal of PPE. **Assign clinical and non-clinical personnel exclusively to the patient** and must not care for other patients.
- **Maintain a log of persons entering the patient's room. Restrict visitors.** . Exceptions will be considered on a case by case basis, in consultation with Infection Control.
- **Limit use of needles/sharps** and immediately dispose of them in a puncture-proof, sealed container. Do NOT draw blood or take lab specimens unless ordered by physician. Lab must be notified prior to drawing bllod. Meticulous handling of blood and body fluids is imperative.
- **Use disposable medical equipment and supplies** when possible**. Dedicate any reusable medical equipment** for the provision of patient care. For more detailed please refer to Nova Scotia EVD Protocol.

Reporting

- Patients suspected or confirmed to have EVD must be reported **immediately**:
  - Physician must call The Medical Officer of Health (MOH) at 902-481-5800 and ask for MOH on call. (or after hours through locating at 902-473-2220.)
  - Delegated department person to make internal CDHA notification as per EVD Communications protocol at your site.

Ebola Specimen Testing

- **No specimen testing is to be done unless in consultation with the Medical Officer of Health, Infectious Diseases and Microbiology**
- The decision for specimen collection and testing should be based on the clinical status of the patient , and an on-going point of care risk assessment.
    - Improper handling of specimens poses a risk to healthcare and laboratory personnel.
    - Testing must be completed by staff proficient in phlebotomy
    - Refer to policy: CDHA CC 85-09 Laboratory Testing Requests, Collecting and Transporting Laboratory Specimens from patients with Suspected Viral Hemorrhagic Fever (VHF)

Treating Ebola

- There is no specific vaccine or treatment for Ebola virus disease.
- Patients are treated for their symptoms (i.e. fluid resuscitation and management, oxygen therapy, etc.)
- Intensive care, especially early intravenous fluid and electrolyte management, may increase survival rate.
- Range of potential treatments (blood products, immune therapies, drug therapies) are being evaluated.
- No licensed vaccines available yet; 2 potential vaccines are undergoing human safety testing.

Infection Control Measures

- Patients with suspected or confirmed EVD **must** be:
  - Placed on **Droplet and Contact precautions** (in addition to using **Routine Practices**)
  - Placed in a **private room** with it's own bathroom (or commode with Hygie system).
  - The door is to remain closed and there is to be restricted access.
  - Only **essential hospital personnel** should enter the patient's room and a **log must be kept** of those persons entering room.
    - *Log faxed daily to Public Health and Employee Health*

Infection Control Measures

- Clinical personnel must be assigned exclusively to this patient; minimizing the number of persons in contact with the patient. Minimize number of staff in contact with patient; batch tasks to limit time spent in room.
- Additional personnel should be posted at the patient's door to monitor the appropriate and consistent use of PPE, monitor entry into room, and relieve for breaks
- Visitors will be restricted. Exceptions considered on case by case basis with Infection Control.
  - Other communication modes are encouraged (Skype, face time, etc.)

Infection Control Measures

- **Only essential medical equipment & supplies should be brought into room.**
  - Remove unnecessary equipment and cover equipment that cannot be removed with plastic, prior to placing the patient in the room.
  - Use single use or disposable medical equipment and supplies (when possible)
  - Dedicate reusable equipment to patient. Reprocess based on risk assessment by Infection Control

Infection Control Measures

- **Limit use of needles/sharps** and immediately dispose of them in a puncture-proof, sealed container. Follow **safe injection** practices.
  - See CDHA CC 85-09 Laboratory Testing Requests, Collecting and Transporting Laboratory Specimens from patients with Suspected Viral Hemorrhagic Fever (VHF)

- EVD related fatality including any fatality in the health care facility will be co-managed with the Nova Scotia Medical Examiners office.

Infection Control Measures

- **Environmental Services**
  - See Environmental Services guidelines for cleaning EVD room and Policy for Waste Management. **All horizontal and frequently touched surfaces should be cleaned at least twice daily and when soiled**.
  - Surfaces that are likely to be touched and/or used frequently should be cleaned and disinfected on a more frequent schedule. This includes surfaces that are in close proximity to the patient (e.g., bedrails, bedside/over-bed tables, call bells) and frequently touched surfaces in the patient care environment, such as door knobs, surfaces in the patient's bathroom.
  - EVD is an enveloped virus that **is effectively killed by hospital-approved general virucidal disinfectant**

PPE for EVD patients

- All persons entering the patient room must wear:
  - Gloves (nitrile)
  - Gown (disposable fluid resistant or impermeable)
  - Eye Protection (goggles or face shield)
  - Facemask
- **Additional personal protective equipment** will be required if there is a risk of exposure to blood or other body fluids (double gloving, leg and shoe coverings, head & neck covering) based on the **Point of Care Risk Assessment**

Personal Protective Equipment (PPE)

- Designed to provide a barrier that will prevent potential exposure to infectious microorganisms.
- Make sure a second HCP **("buddy")** observes PPE process to ensure inadvertent contamination with eyes, mucous membranes, skin, or clothing does NOT occur.
- **Do NOT adjust PPE during patient care.** Change any item that may be compromised.
- The type of PPE that you will require is based on your **point of care risk assessment**

Personal Protective Equipment Selection for HCW Who May be Exposed to Ebola

	Suspect or Confirmed Case EVD	**Suspect or Confirmed Case EVD: Exposure to copious drainage of blood &/or Body Fluids**	**Suspect or Confirmed Case EVD: Aerosol Generating Procedure (AGMP)**
Additional Precautions	*Droplet and Contact Precautions for EVD*	*Droplet and Contact Precautions With* ***Additional PPE*** *for EVD*	*Droplet and Contact Precautions with Additional PPE for EVD*
Based on PCRA of Exposure to Blood and/or Body Fluids	▫ Early stages EVD when patient minimally symptomatic i.e.. Without diarrhea and vomiting or patients body fluids are contained ▫ convalescing stage of EVD	▫ Progressing and later stages of EVD when patient experiences significant vomiting, diarrhea, hemorrhagic symptoms i.e.. With copious amounts of body fluids	Examples of AGMP's: ▫ Intubation ▫ Bronchoscope ▫ Sputum Induction ▫ open suctioning of airways
PPE for any contact with patient/ patient environment	▫ Impermeable Gown ▫ Surgical Facemask ▫ Extended Cuff Nitrile Gloves ▫ Face Shield ▫ Head/Neck Cover	▫ Impermeable Gown ▫ Surgical Facemask ▫ Double Gloves: Extended Cuff Nitrile Gloves ▫ Face Shield ▫ Impermeable Head/Neck Cover ▫ Impermeable Boot Covers ▫ Optional impermeable Apron	▫ PPE same as same as EVD with exposure to copious amounts of secretions/excretions EXCEPT ▫ **N-95 Surgical Respirator instead of Facemask Mask** ▫ **Perform in Negative Pressure Room**

If any item of PPE becomes compromised, the HCW must change the affected item. I.e.. Gloves and apron.

***foot wear as per hospital Dress Code Policy CH 08-095**

Putting on PPE

- Sequence is not critical. The order is for ease of putting on.
- Remember Hand Hygiene
- Gloves should be last
- Put on all required PPE prior to entering the patient's room
- Ensure "buddy" observes & checks you are covered

Removing PPE

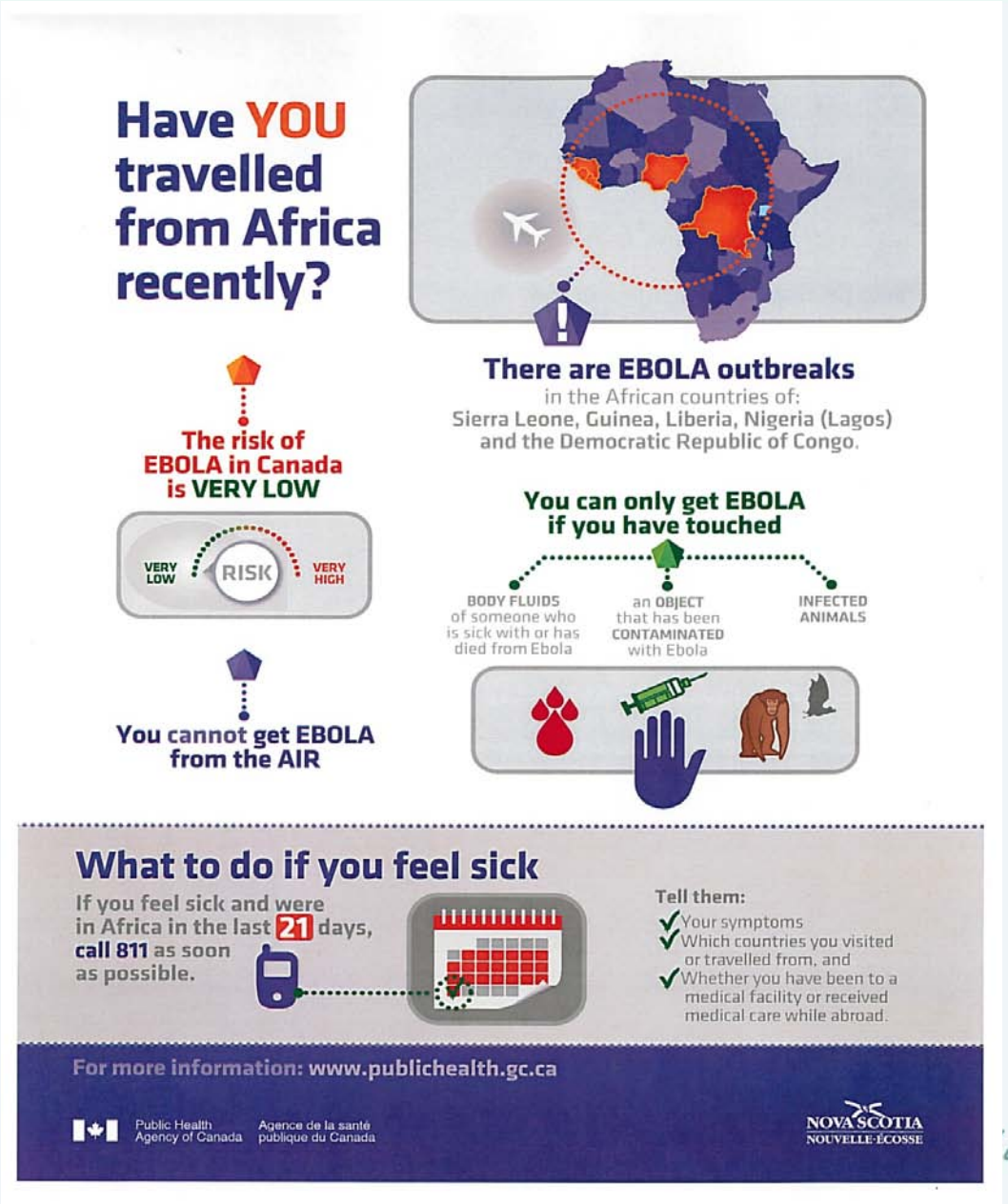
- The order for removal is crucial to prevent self-contamination.
- All PPE (except the N-95 mask) should be removed and discarded in the proper receptacle in the patient's room.
- Extra care must be taken: **Avoid contact between soiled gowns/gloves and any area of the face, skin, or openings in the skin .**
- **Hands must be cleaned before contact with face.** If there is any doubt, clean hands again.
- Ensure "buddy" observes and monitors proper removal

Protect Yourself

- Precautionary Principle that applies to ALL unknown illness of infectious origin:
  - Avoid direct contact with blood, saliva, vomit, urine and other body fluids.
  - Avoid contact with objects soiled with blood and body fluids.

EVD: Employee Health

- **All staff must follow Employee Health guidance on self care and self monitoring when caring for a patient with suspect or confirmed EVD.**
- **See Employee Health Guidelines on IPAC website**
  - **Any staff member who is symptomatic or has had an unprotected exposure to blood, body fluids, secretions, or excretions of a patient with suspected or confirmed EVD must immediately stop work and report to their manager and Exposure Line at 473-4666.**
    - **He/she must remain out of the workplace until cleared for work by Employee Health.** The Occupational Health Nurse will follow up with staff member and advise ill and exposed staff as per Public Health guidelines.



The risk to the Nova Scotia Health System of encountering an EVD patient remains low. However, reasonable and responsible precautions must be taken to plan for and respond to this potential situation.

EVD Summary

The 2014 Ebola outbreak in West Africa is the largest in history and has affected multiple countries

Think Ebola: healthcare providers should be aware of clinical presentation and risk factors for EVD

Human-to-human transmission by direct contact

- No human-to-human transmission via inhalation (aerosols)
- No transmission before symptom onset

Early case identification, isolation, treatment and effective infection control are essential to prevent Ebola transmission

Additional Information

- Contact Infection Prevention and Control main office 902-473-2659
- CDHA CC 85-09 Laboratory Testing Requests, Collecting and Transporting Laboratory Specimens from patients with Suspected Viral Hemorrhagic Fever (VHF)
- CDHA CH 08-095 Dress Code Policy
- On Infection Control Website :
  - Screening & management of Patients with Suspect EVD in Emergency Rooms
  - Environmental Services : Cleaning and Disinfection of a Room with a patient suspect or confirmed to have Ebola
  - Environmental Services: Waste Management Guidelines for Ebola
  - Employee Health and safety: LMS Education Module for Employees caring for a Patient with Ebola

*protocols evolve with lessons learned and for the most current documents always refer to these sites

References

- Ebola Virus Disease: Infection Prevention and Control Measures for Healthcare Settings in Nova Scotia Interim Guidance (October 24, 2014) Retrieved from: http://novascotia.ca/dhw/cdpc/documents/Ebola-Virus-Disease-Infection-Prevention-and-Control-Guidelines.pdf
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- Centers for Disease Control and Prevention (CDC) (2014). Infection prevention and control recommendations for hospitalized patients with known or suspected Ebola hemorrhagic fever in U.S. hospitals. Retrieved from; http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html