Ebola Virus Disease (EVD) Interim Protocol

These guidelines may change as more information becomes available. For updates and other guidelines on Ebola virus disease, please refer to the Ebola virus site on the Manitoba Health Public Health website: http://www.gov.mb.ca/health/publichealth/diseases/ebola.html.

1. Case Definitions

A person with EVD-compatible symptoms is defined as an individual presenting with fever (temperature ≥ 38.0° C **OR** at least one of the following symptoms/signs:

- subjective fever
- malaise
- myalgia
- headache
- arthralgia
- fatigue
- loss of appetite
- conjunctival redness
- sore throat
- chest pain
- abdominal pain
- nausea
- vomiting
- diarrhoea that can be bloody
- haemorrhage
- unexplained bleeding
- erythematous maculopapular rash on the trunk (1).

Epidemiological Risk Factors:

- Individual who cared for a case of Ebola Virus Disease (EVD).
- Laboratory worker handling Ebola virus or processing body fluids from a case of EVD.
- Individual who spent time in a healthcare facility where cases of EVD are being treated in a country/region with widespread and intense Ebola virus transmission.
- Sexual contact with an EVD case.
- Close contact in households, healthcare facilities, or community settings with a person with Ebola while the person was symptomatic – close contact is defined as being for a prolonged period of time within approximately 2 metres (6 feet) of a person with Ebola.
- Contact with any human remains of a case of EVD or contact with human remains in a country/region with widespread and intense Ebola virus transmission.
- Contact with bats, primates or wild animal bush meat from affected countries/regions.
- A travel history to a country/region with widespread and intense Ebola virus transmission within 21 days constitutes a low risk factor.

1.1 Person Under Investigation (PUI):

A person with EVD-compatible symptoms (as defined above) AND EVD has not been ruled out.

- A travel history to a country/region with widespread and intense EVD transmission within 21 days of symptom onset OR exposure to one of the epidemiological risk factors within 21 days of symptom onset.
- With or without pending laboratory results for EVD.

1.2 Confirmed Case:

A person with laboratory confirmation of Ebola virus infection using at least one of the methods below:

- Isolation and identification of virus from an appropriate clinical specimen (blood, serum, tissue, urine specimens or throat secretions) (performed at the National Microbiological Laboratory) **OR**

- Detection of virus-specific RNA by reverse-transcriptase PCR (polymerase chain reaction) from an appropriate clinical specimen (e.g. blood, serum, tissue) using two independent targets or two independent samples **AND** confirmed by the National Microbiology Laboratory by nucleic acid testing or serology **OR**

- Demonstration of virus antigen in tissue (e.g. skin, liver or spleen) by immunohistochemical or immunofluorescent techniques **AND** another test e.g. PCR **OR**

- Demonstration of specific IgM **AND** IgG antibody by EIA, immunofluorescent assay or Western Blot by the National Microbiology Laboratory or an approved WHO collaboration centre **OR**

- Demonstration of a fourfold rise in IgG titre by EIA, immunofluorescent assay from an acute vs a convalescent serum sample (performed at the National Microbiology Laboratory) (1).

2. Reporting and Other Requirements

Laboratory:

- All specimens for Ebola virus testing must be directed through Cadham Provincial Laboratory to the National Microbiology Laboratory and must follow the appropriate collection, submission and transport protocols. Refer to Section 6 *Diagnosis* in this protocol.
- All positive laboratory results are immediately reportable by telephone to the Medical Officer of Health on call (204-788-8666) and to the Public Health Surveillance Unit by secure fax (204-948-3044).

Health Care Professional:

- Confirmed cases of EVD and persons under investigation for EVD should be immediately reported to the Medical Officer of Health on call (204-788-8666) by the Infectious Disease physician reviewing the case. The MOH will report the case to Public Health, Manitoba Health who will notify the Duty Officer at the Public Health Agency of Canada as required.
- The Public Health Agency of Canada's *Ebola Virus Disease (EVD) Case Report Form* (http://www.phac-aspc.gc.ca/id-mi/vhf-fvh/assets/pdf/evd_crf-mvd_fdc-eng.pdf) should be

completed for all confirmed cases and persons under investigation by Public Health with assistance from the attending health care professional as needed. The form should be forwarded to the Manitoba Health Public Health Surveillance Unit (secure fax: 204-948-3044).

3. Clinical Presentation and Natural History

EVD, formerly known as Ebola haemorrhagic fever, is a severe acute viral illness disease characterized by sudden onset of fever, malaise, myalgia and headache, followed by pharyngitis, vomiting and diarrhoea and maculopapular rash (2). Bleeding is not universally present but can manifest later in the course as petechiae, ecchymosis/bruising, or oozing from venipuncture sites and mucosal haemorrhage (3). Frank haemorrhage is less common (3). Non-fatal cases have fever for several days and typically improve around day 6-11 (2). Convalescence; however, is extended and often associated with sequelae such as myelitis, recurrent hepatitis, psychosis, or uveitis (2). EVD outbreaks have a case fatality rate of up to 90% (4).

4. Etiology

Ebola virus is a member of the family *Filoviridae* (5). Five Ebola subtypes that infect humans have been identified (4). The subtypes include Bundibugyo ebolavirus (BDBV), Zaire ebolavirus (EBOV), Reston ebolavirus (RESTV), Sudan ebolavirus (SUDV) and Tai Forest ebolavirus (TAFV) (4). BDBV, EBOV and SUDV have been associated with large outbreaks in Africa, whereas RESTV and TAFV have not (4). The RESTV may be less capable of causing disease in humans than other Ebola species; but, more definitive studies are needed (4).

5. Epidemiology

5.1 Reservoir: The natural reservoir of Ebola virus is unknown (6). Although non-human primates have been a source of infection for humans, they are not thought to be the reservoir but an accidental host similar to humans (4). The virus can be replicated in some bat species native to the area where the virus is found (6).

5.2 Transmission: Ebola virus is introduced into the human population through close contact with the blood, secretions, organs or other bodily fluids of infected animals found ill or dead in the rainforest (e.g., chimpanzees, fruit bats, monkeys) (4). Person-to-person Ebola virus transmission is by direct contact (e.g. through broken skin or mucous membranes) with the blood or other bodily fluids (stool, urine, saliva, semen) of an EVD patient and/or indirect contact with environmental surfaces and fomites (e.g. needles) soiled with contaminated body fluids (2). The Ebola virus has been detected in semen during the acute and convalescent phases of the illness; therefore sexual transmission is possible (2, 7, 8). Airborne transmission has not been documented as a mechanism of person-to- person spread (2).

Transmission to health care workers has been reported when appropriate infection prevention and control measures have not been observed (e.g, reuse of unsterilized syringes or needles, inappropriate use of personal protective equipment) (4, 6). Humans may be infected by handling sick or dead non-human primates or handling the bodies of deceased humans (6). The virus can survive in liquid or dried material for several days (6).

5.3 Occurrence:

5.3.1 General: Ebola virus disease occurs mainly in areas surrounding rain forests in central Africa (6). The first Ebola virus outbreaks were recorded in 1976 in Sudan and the Democratic Republic of the Congo (formerly Zaire). There were 318 cases with 88% fatality reported in the Democratic Republic of Congo outbreak (6). Subsequent outbreaks occurred in Sudan, Gabon, Côte-d'Ivoire and Uganda (6). The most recent EVD outbreak (2014 - 2015) is the largest outbreak of EVD ever documented and the first recorded in the West Africa countries of Guinea, Sierra Leone and Liberia (9).

5.3.2 Manitoba/Canada: There has never been a confirmed case of Ebola virus infection in Manitoba or in Canada.

5.4 Incubation Period: The incubation period of EVD varies from 2 -21 days (2). There is no risk of transmission during the incubation period (2).

5.5 Host Susceptibility and Resistance: All ages are susceptible (5).

5.6 Period of Communicability: Cases are not considered to be communicable before the onset of symptoms but communicability increases with each stage of illness and the case remains communicable as long as blood and body fluids contain the virus. This includes the post-mortem period (2). The Expert Working Group for the Canadian Guidelines on Sexually Transmitted Infections recommends that, while the risk of sexual transmission of Ebola virus during convalescence appears to be low, individuals recovering from EVD either abstain from sexual intercourse or consistently use latex condoms for 15 weeks after the date of symptom onset (2).

6. Diagnosis

If a patient shows early symptoms of EVD and there is reason to believe that EVD should be considered, the patient should be isolated immediately using Droplet/Contact precautions in addition to Routine Practices, plus Airborne precautions should be used for aerosols during aerosol generating medical procedures (AGMPs). Please refer to Manitoba Health, Healthy Living and Seniors *Ebola Virus Disease (EVD) Infection Prevention and Control Guidelines* available through the Public Health website: http://www.gov.mb.ca/health/publichealth/diseases/ebola.html.

Consultation with an Infectious Disease (ID) physician must occur for all PUIs and confirmed cases of EVD. The infectious disease service can be reached 24/7 at 204-787-2071.

EVD Risk Assessment:

Individuals returning from or arriving in Manitoba from Ebola-affected countries who have symptoms suggestive of EVD should be directed to the appropriate health care facility within their region of residence for assessment if possible. Some regions will have pre-designated specific facilities to receive these patients. An EVD risk assessment must be completed for all suspect EVD cases in consultation with an ID physician to ensure that additional diagnostic considerations are determined (e.g., malaria, typhoid fever etc.). If the clinical presentation and epidemiology is consistent with EVD, the ID specialist must notify the following:

- The on-call Medical Officer of Health at (204)788-8666; and

- The on-call Physician for Cadham Provincial Laboratory (CPL – at 204-945-6123, after hours at 204-945-6655 or anytime through 204-787-2071) so that they may arrange the necessary provincial and National-level resources.

When Specimens Should be Collected for Ebola Virus Testing:

Ebola virus is detected in blood only after onset of symptoms, most notably fever. It may take up to 3 days after symptom onset for the virus to reach detectable levels (9).

Specimen Collection and Handling:

No clinical specimens (including routine diagnostic tests) should be obtained in PUIs or Confirmed cases of EVD before the on-call Physician for Cadham Provincial Lab has been consulted.

All laboratory requisitions should be clearly labelled as "Suspect Ebola".

Health care workers collecting diagnostic specimens from patients suspected to have EVD, in addition to Routine Practices, must apply Droplet/Contact precautions plus Airborne precautions for aerosols during AGMPs. Please refer to Manitoba Health, Healthy Living and Seniors *Ebola Virus Disease (EVD) Infection Prevention and Control Guidelines* available through the Public Health website: http://www.gov.mb.ca/health/publichealth/diseases/ebola.html.

Confirmed EVD patients will also require other routine laboratory tests.

- Specimens should be kept to the minimum required for patient management and evaluation. AGMPs should be avoided unless absolutely necessary. If AGMPs must be done, Airborne precautions must be applied.

- Specimens to be obtained should be discussed in advance between clinicians and appropriate specialists for each laboratory area. A clear list of which specimens are to be collected and to which laboratory they will be submitted should be made. Each lab should be notified in advance that these specimens are being collected so that they may make appropriate preparations.

- Specimens within facility should be transported in person.

Specimen Shipping and Transportation Instructions:

All suspect EVD specimens must be shipped to CPL, and prior notification of CPL staff is required before shipping commences (call 204.945.6805). Purolator is the recommended courier – taxis or other casual transport is not appropriate.

All samples must be shipped in accordance with the Transportation of Dangerous Goods Regulation (TDGR) by an individual and courier certified in TDG. TDGR requires handling and transport of EVD samples according to the international procedures for transport of category A infectious substances (UN2814). See Section 8.0 of the online CPL Guide to Services for Packaging and Transport instructions (www.gov.mb.ca/health/publichealth/cpl/docs/guide.pdf).

Specimen Testing for Ebola Virus:

Clinical specimens from patients suspected of having EVD pose an extreme biohazard risk for laboratory personnel. Samples taken from suspected Ebola cases for diagnosis should be handled by trained staff and processed in specially equipped laboratories.
For more information on specimen collection, shipping and testing, refer to the latest Cadham Provincial Laboratory's *Collection, Submission and Transportation of Samples Testing for Ebola Virus Disease (EVD) from Suspect Cases in Manitoba* and the Public Health Agency of Canada's *Interim Biosafety Guidelines for Laboratories Handling Specimens from Patients Under Investigation for Ebola Virus Disease (EVD)* http://www.phac-aspc.gc.ca/id-mi/vhf-fvh/ebola-biosafety-biosecurite-eng.php .

7. Key Investigations for Public Health Response

- Interview cases for identification of contacts and monitor cases as described below.
- Initiate symptom monitoring of contacts as detailed in the *Ebola Virus Disease (EVD) Public Health Contact Management Interim Guidelines* http://www.gov.mb.ca/health/publichealth/cdc/protocol/ebolacontactguidelines.pdf .

8. Control

There is no licensed prophylaxis, treatment or vaccine available for protection against EVD (2).

8.1 Management of Cases:

- Individuals presenting to a health care provider or who contact Health Links-Info Santé and are suspected to be an EVD case should be directed when, where and how (e.g., mode of transport) to go for medical assessment. The receiving facility should be notified prior to arrival of the individual so that the facility can ensure appropriate IPC measures are in place to safely assess symptomatic individuals. Individuals should be instructed to report travel history or contact history immediately upon presenting to a health care setting. Refer to health care provider letter available at: http://www.gov.mb.ca/health/publichealth/cdc/docs/hcp/2015/021715.pdf
- The individual should be instructed what to do to prevent the transmission of the virus to others, e.g., self-isolation as quickly as possible.
- Report confirmed cases and PUIs immediately as described in section 2 above.
- Maintain a list of PUIs and confirmed cases, including case status/prognosis and location of hospitalization and provide updated information (through normal reporting channels) to the Public Health Agency of Canada as requested for situational awareness and International Health Regulations (IHR) requirements (2).
- There is no effective antiviral treatment for Ebola infections. The treatment is supportive and is directed at maintaining renal function and electrolyte balance, and at combating haemorrhage and shock (10). Admission to an intensive care unit may be required. An Ebola virus disease clinical care guidelines document was developed by the Association of Medical Microbiology and Infectious Diseases Canada (AMMI), in conjunction with the Canadian Association of Emergency Physicians (CAEP) and the Canadian Critical Care Society (CCCS) http://www.ammi.ca/media/73235/Ebola%20Clinical%20Care%20Guidelines%20v2%2028%20Oct%202014.pdf .

- The period of infectiousness in breast milk is unknown (11, 12); therefore, women who are breastfeeding should be advised to stop breastfeeding.
- For convalescent confirmed cases:
    - Provide counseling on the risk of transmission of EVD through blood and body fluids.
    - Manage discharge (including but not limited to continuation of infection control precautions in the home setting) on a case-by-case basis in consultation with infectious disease specialists, Infection Prevention and Control (IPC) and Public Health (PH).
    - Strongly advise abstinence from sexual activity (or consistent use of latex condoms) for 15 weeks following onset of illness.
    - Establish process for ongoing monitoring (for the purpose of monitoring for sequelae and re-enforcing recommendations and IPC measures during communicable period).
    - Facilitate laboratory testing of these individuals to determine when the individual's body fluids are free of the Ebola virus. Only at that time, should the individual be considered non-communicable and therefore no longer needing to be monitored by Public Health (2).

Infection Prevention and Control Measures:

- Rigorous adherence to recommended infection prevention and control practices is required to prevent the infection from spreading to others.
- Health care personnel caring for suspected patients with EVD should be knowledgeable and experienced in use of appropriate precautions.
- Please refer to Manitoba Health, Healthy Living and Seniors *Ebola Virus Disease (EVD) Infection Prevention and Control Guidelines* available through the Public Health website: http://www.gov.mb.ca/health/publichealth/diseases/ebola.html.
- For the handling of cadavers, The *Public Health Act* Dead Bodies Regulation https://www.canlii.org/en/mb/laws/regu/man-reg-27-2009/latest/part-1/man-reg-27-2009-part-1.pdf should be adhered to. A protocol for handling dead bodies infected with Ebola virus is under development.

8.2 Management of Contacts:

If Regional Public Health is notified of a confirmed case of EVD, Regional Public Health should initiate contact tracing.

Refer to the Manitoba Health, Healthy Living and Seniors *Ebola Virus Disease (EVD) Public Health Contact Management Interim Guidelines* available at:
http://www.gov.mb.ca/health/publichealth/cdc/protocol/ebolacontactguidelines.pdf

8.3 Outbreak Management:

- As per case and contact management above.

8.4 Preventive Measures:

- Appropriate case and contact management as detailed above in sections 8.1 and 8.2.
- Practicing proper hand hygiene.
- First aid should be performed immediately if there has been exposure to blood or body fluids from a suspected or confirmed EVD case. 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 skin should be rinsed thoroughly with running water if contaminated with blood, body fluids or excretions. Exposed persons should receive medical evaluation and follow-up care as per Section 8.2 *Management of Contacts.*
- Individuals should avoid direct contact with a person or corpse infected with the Ebola virus (13). Contact with or handling an animal (live or corpse) suspected of having Ebola should also be avoided. In Manitoba, The *Public Health Act* Dead Bodies Regulation https://www.canlii.org/en/mb/laws/regu/man-reg-27-2009/latest/part-1/man-reg-27-2009-part-1.pdf should be adhered to.
- Avoiding non-essential travel to affected areas. Travellers from affected areas should immediately seek medical attention at the first sign of illness (13).

- While the risk of sexual transmission of Ebola virus during convalescence appears to be low, individuals recovering from EVD should either abstain from sexual intercourse or wear condoms for 15 weeks after the date of symptom onset (2).

Additional Resources

1. Public Health Agency of Canada at: http://www.phac-aspc.gc.ca/id-mi/vhf-fvh/ebola-eng.php .

2. World Health Organization at: http://www.who.int/mediacentre/factsheets/fs103/en/ .

3. Pan American Health Organization at: http://www.paho.org/hq/ .

4. Centers for Disease Control and Prevention at: http://www.cdc.gov/vhf/ebola/index.html .

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