

# Appendix A: Disease-Specific Chapters

Chapter: Hemorrhagic fevers caused by: i) Ebola virus and ii) Marburg virus and iii) Other viral causes including bunyaviruses, arenaviruses and flaviviruses.

Revised May 2014

## Hemorrhagic fevers caused by: i) Ebola virus and ii) Marburg virus and iii) Other viral causes including bunyaviruses, arenaviruses and flaviviruses.

Communicable

Virulent

### **Health Protection and Promotion Act, Section 1 (1)**

#### **Health Protection and Promotion Act:**

#### **Ontario Regulation 558/91 – Specification of Communicable Diseases**

#### **Health Protection and Promotion Act:**

#### **Ontario Regulation 559/91 – Specification of Reportable Diseases**

## 1.0 Aetiologic Agent

Viruses from several families can cause viral hemorrhagic fever (VHF). Members of the **Filoviridae** family, the Ebola and Marburg viruses, are antigenically distinct, and cause VHF. In Africa, 3 different subtypes of the Ebola virus have been associated with human illness.<sup>1</sup> (1). Members of other viral families causing VHF include **bunyaviruses** (hantaviruses, Crimean Congo hemorrhagic fever viruses, Rift Valley fever virus), **arenaviruses** (Lassa virus, Lujo virus, Guanarito, Machupo, Junin, and Sabia viruses) and **flaviviruses** (Yellow Fever virus, Dengue virus, Kyasanur Forest virus, Omsk virus).

## 2.0 Case Definition

### 2.1 Surveillance Case Definition

[See Appendix B](#)

### 2.2 Outbreak Case Definition

The outbreak case definitions are established to reflect the disease and circumstances of the outbreak under investigation. The outbreak case definitions should be created in consideration of the provincial surveillance case definition. For example, confirmed outbreak cases must at a minimum meet the criteria specified for the provincial surveillance confirmed case classification. Consideration should also be given to the following when establishing outbreak case definitions:

- Clinical and/or epidemiological criteria;
- The time frame for occurrence (i.e., increase in endemic rate);
- A geographic location(s) or place(s) where cases live or became ill/exposed;
- Special attributes of cases (e.g., age, underlying conditions);
- Further strain characterization and typing as appropriate, which may be used to support linkage; and

- Outbreak cases may be classified by levels of probability (i.e., confirmed, probable and/or suspect).

## 3.0 Identification

### 3.1 Clinical Presentation

Viral hemorrhagic fevers are associated with an acute onset of fever, severe illness and hemorrhagic symptoms including hemorrhagic or purpuric rash, epistaxis, hematemesis, hemoptysis, blood in stool and other hemorrhagic symptoms.<sup>2</sup>

In the case of dengue fever, clinical presentation is mild in comparison to dengue hemorrhagic fever including fever, headache, myalgia, nausea and vomiting.<sup>1</sup> Whereas cases of dengue hemorrhagic fever are reportable, cases of dengue fever without identified hemorrhagic manifestations are not reportable.

In severe and fatal forms, the hemorrhagic diathesis is often accompanied by hepatic damage, renal failure, CNS involvement and terminal shock with multi-organ dysfunction.<sup>1</sup>

### 3.2 Diagnosis

[See Appendix B](#)

**Note:** Any testing related to suspected VHF should be carried out under level 4 containment facilities (National Microbiology Laboratory) due to issues of safety, security, expertise, and personnel vaccination.

## 4.0 Epidemiology

### 4.1 Occurrence

Viral hemorrhagic fevers are not endemic to Ontario and to date no cases have been reported.

Ebola has been isolated in Sudan, Democratic Republic of Congo, Uganda, Cotê d'Ivoire, Gabon, Uganda and most recently Guinea (in this latter case potentially involving neighboring countries, especially Sierra Leone and Liberia). Marburg has been isolated in Uganda, Zimbabwe, Kenya, Democratic Republic of Congo and Angola.

Please refer to the Public Health Ontario Monthly Infectious Diseases Surveillance Reports and other infectious diseases reports for more information on disease trends in Ontario.

<http://www.publichealthontario.ca/en/DataAndAnalytics/Pages/DataReports.aspx>

### 4.2 Reservoir

Unknown for Ebola and Marburg infections. In Africa, human index cases have been linked to exposure to monkeys, chimpanzees, gorillas, duikers, and porcupines and other animals found dead or killed in the rain forests.<sup>1</sup>

For dengue fever, in tropical urban centres, a cycle between humans and aedes aegypti mosquito sustains the viruses. It is also thought that in South-East Asia and West African forest the reservoir for the viruses is a monkey/mosquito cycle.

### 4.3 Modes of Transmission

For ebola and marburg, person to person transmission occurs by direct contact with infected blood, secretions organs or semen. Risk is highest during the late stages of illness when the infected person is vomiting, having diarrhea or haemorrhaging and post-mortem contact with bodily fluids. Risk during the incubation period is low.<sup>1</sup>

Nosocomial infections have been frequent; virtually all ebola (Zaire, now Democratic Republic of Congo) patients who acquired infection from contaminated syringes and needles have died.<sup>1</sup>

For dengue hemorrhagic fever, no direct person to person spread; persons are infective for mosquitoes (principally *Aedes Aegypti*, similar to the malaria cycle) from shortly before the febrile period to the end thereof, usually 3-5 days. The mosquito becomes infective 8-12 days after the viraemic blood-meal and remains so for life.<sup>1</sup>

### 4.4 Incubation Period

**Ebola and Marburg virus diseases:** Usually 2 to 21 days.<sup>1</sup>

**Dengue:** From 3-14 days, commonly 4-7 days.<sup>1</sup>

### 4.5 Period of Communicability

Ebola and marburg are communicable as long as blood and secretions contain virus. Ebola virus was isolated from seminal fluid on the 61st day after onset of illness in a laboratory acquired case.<sup>1</sup>

For dengue hemorrhagic fever, the mosquito becomes infective 8-12 days after the viraemic blood-meal and remains so for life.<sup>1</sup> There is no person-person transmission of dengue.

### 4.6 Host Susceptibility and Resistance

All ages are susceptible.<sup>1</sup> Recovery from infection with one dengue virus serotype provides lifelong homologous immunity but only short-term protection against other serotypes and may exacerbate disease upon subsequent infections potentially leading to Dengue *Hemorrhagic* Fever (as opposed to Dengue Fever).<sup>1</sup>

## 5.0 Reporting Requirements

### 5.1 To local Board of Health

Individuals who have or may have hemorrhagic fever shall be reported as soon as possible to the medical officer of health by persons required to do so under the Health Protection and Promotion Act (HPPA).

### 5.2 To the Ministry of Health and Long-Term Care (the ministry) or Public Health Ontario (PHO), as specified by the ministry

The board of health shall notify PHO **immediately** by phone upon receiving report.

Report only case classifications specified in the case definition.

Cases shall be reported using the integrated Public Health Information System (iPHIS), or any other method specified by the Ministry **within one (1) business day of receipt of initial notification** as per *iPHIS Bulletin* Number 17: Timely Entry of Cases.<sup>3</sup>

The minimum data elements to be reported for each case is specified in the following:

- *Ontario Regulation 569* (Reports) under the Health Protection and Promotion Act (HPPA);
- The iPHIS User Guides published by PHO; and
- Bulletins and directives issued by PHO.

Once reported, PHO will report confirmed and probable cases of hemorrhagic fever immediately to the 24-hour Public Health Agency of Canada emergency line (1-800-545-7661). The Public Health Agency of Canada will be responsible for contacting the International Public Health Authorities under the *International Health Regulations* (IHR, 2005).

## 6.0 Prevention and Control Measures

### 6.1 Personal Prevention Measures

The Public Health Agency of Canada recommends travelers in areas with Ebola avoid direct contact with blood or bodily fluids of a person or corpse infected with the Ebola virus. Also, avoid contact with or handling an animal suspected of having Ebola haemorrhagic fever.

Check travel health notices for specific recommendations:

<http://www.phac-aspc.gc.ca/tmp-pmv/notices-avis/index-eng.php>

Basic personal measures to prevent mosquito bites are strongly recommended in terms of dengue/Dengue Hemorrhagic Fever prevention.

### 6.2 Infection Prevention and Control Strategies

Public Health response will be under the direction of provincial and federal jurisdiction.

Refer to Public Health Ontario's website at [www.publichealthontario.ca](http://www.publichealthontario.ca) to search for the most up-to-date Provincial Infectious Diseases Advisory Committee (PIDAC) best practices on Infection Prevention and Control (IPAC). PIDAC best practice documents can be found at:

[http://www.publichealthontario.ca/en/BrowseByTopic/InfectiousDiseases/PIDAC/Pages/PIDAC\\_Documents.aspx](http://www.publichealthontario.ca/en/BrowseByTopic/InfectiousDiseases/PIDAC/Pages/PIDAC_Documents.aspx)

### 6.3 Management of Cases

Clinical management of VHF and Dengue Hemorrhagic Fever (DHF), in the latter especially if complicated by dengue shock syndrome, would be the responsibility of medical specialists such as infectious disease specialist or intensivist.

### 6.4 Management of Contacts

Contacts of DHF are not at-risk, given the absence of person-person transmission.

## 6.5 Management of Outbreaks

Given the severity and rarity of hemorrhagic fevers, a single confirmed case constitutes an outbreak.

## 7.0 References

1. Heymann DL, editor. Control of communicable diseases manual. 18th ed. Washington, DC: American Public Health Association; 2004.
2. World Health Organization, Department of Communicable Disease Surveillance and Response. WHO recommended surveillance standards. 2nd ed. Geneva, Switzerland: WHO; 1999. Available from:  
[http://www.who.int/csr/resources/publications/surveillance/WHO\\_CDS\\_CSR\\_ISR\\_99\\_2\\_EN/en/](http://www.who.int/csr/resources/publications/surveillance/WHO_CDS_CSR_ISR_99_2_EN/en/)
3. Ontario. Ministry of Health and Long-Term Care. Timely entry of cases and outbreaks. iPHIS Bulletin. Toronto, ON: Queen's Printer for Ontario; 2012:17.

## 8.0 Additional Resources

*Health Protection and Promotion Act*, R.S.O. 1990, c. H.7. Available from:  
[http://www.e-laws.gov.on.ca/html/statutes/english/elaws\\_statutes\\_90h07\\_e.htm](http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90h07_e.htm).

Reports, R.R.O. 1990, Reg. 569. Available from:  
[http://www.e-laws.gov.on.ca/html/regs/english/elaws\\_regs\\_900569\\_e.htm](http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_900569_e.htm)

World Health Organization. International health regulations. 2nd ed. Geneva, Switzerland: WHO; 2005. Available from:  
[http://whqlibdoc.who.int/publications/2008/9789241580410\\_eng.pdf?ua=1](http://whqlibdoc.who.int/publications/2008/9789241580410_eng.pdf?ua=1)

Travel health notices:

<http://www.phac-aspc.gc.ca/tmp-pmv/notices-avis/index-eng.php>

## 9.0 Document History

Table 1: History of Revisions

Revision Date	Document Section	Description of Revisions
May 2014	Document Title	Document title updated from “Disease: Hemorrhagic fevers, including: i) Ebola virus disease; ii) Marburg virus disease, and iii) Other viral causes” to “Disease: Hemorrhagic fevers caused by: i) Ebola virus and ii) Marburg virus and iii) Other viral causes including bunyaviruses, arenaviruses and flaviviruses.”
May 2014	1.0 Aetiologic Agent	Entire section updated.
May 2014	2.2 Outbreak Case Definition	Entire section updated.

<b>Revision Date</b>	<b>Document Section</b>	<b>Description of Revisions</b>
May 2014	3.1 Clinical Presentation	Entire section updated.
May 2014	3.2 Diagnosis	Deleted “Diagnosis is usually through a combination of laboratory tests...”  Deleted “Refer to the Ontario VHF Contingency Plan, 2002 for specific information on diagnostic testing.”
May 2014	4.1 Occurrence	Addition of second and third paragraphs.
May 2014	4.2 Reservoir	First paragraph, second sentence changed from “In Africa, human index cases have been linked to monkeys, chimpanzees, gorillas, duikers, and porcupines and other animals found dead in the rain forests” to “In Africa, human index cases have been linked to exposure to monkeys, chimpanzees, gorillas, duikers, and porcupines and other animals found dead or killed in the rain forests.”  Second paragraph updated.
May 2014	4.3 Modes of Transmission	First paragraph, “Ebola” and “Marburg” changed to “ebola” and “marburg”.  First paragraph, second sentence, addition of “...and post-mortem contact with bodily fluids.”  Second paragraph, “Ebola” changed to “ebola”.  Deletion of “For Dengue, bite of infective mosquitoes...”  Addition of last paragraph “For dengue hemorrhagic fever, no direct...”
May 2014	4.5. Period of Communicability	First paragraph, first sentence, addition of “Ebola and Marburg are communicable” at the beginning of the sentence.  Addition of second paragraph.  Deletion of “For dengue fever, no direct person to person spread...”
May 2014	4.6 Host Susceptibility and Resistance	Addition of “Host” to section title.  Second sentence changed from “Recovery from infection with one serotype...” to “Recovery from infection with one dengue virus serotype...”

<b>Revision Date</b>	<b>Document Section</b>	<b>Description of Revisions</b>
		Second sentence, addition of “leading to Dengue Hemorrhagic Fever (as opposed to Dengue Fever)” at the end of the sentence.
May 2014	5.1 To local Board of Health	Entire section updated.
May 2014	5.2 To the Ministry of Health and Long-Term Care (the Ministry) or Public Health Ontario (PHO), as specified by the Ministry	Section title updated. First paragraph changed from “The board of health shall notify the PHD of the MOHLTC...” to “The board of health shall notify PHO immediately...” Second paragraph, changed from “Report only case classifications specified in the case definition to PHD” to “Report only case classifications specified in the case definition” Addition of last paragraph.
May 2014	6.1 Personal Prevention Measures	Entire section updated.
May 2014	6.2 Infection Prevention and Control Strategies	Entire section updated.
May 2014	6.3 Management of Cases	Entire section updated.
May 2014	6.4 Management of Contacts	Entire section updated.
May 2014	6.5 Management of Outbreaks	Deletion of “Refer to the Ontario VHF Contingency Plan.”
May 2014	7.0 References	Updated.
May 2014	8.0 Additional Resources	Updated.



