

## Supplement

### Case Definitions for Communicable Diseases under National Surveillance

#### Results of Provincial/Territorial (P/T) Consultation Process

Centre for Communicable Disease and Infection Control  
Centre for Food-borne, Enteric and Zoonotic Infectious Diseases  
Centre for Immunization and Respiratory Infections  
National Microbiology Laboratory  
Public Health Agency of Canada (PHAC)

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**Case Definitions for Communicable  
Diseases under National Surveillance**

**2009**

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## List of Abbreviations

Ab	Antibody
AFB	Acid-fast bacilli
AFP	Acute flaccid paralysis
Ag	Antigen
Anti-HBc	Hepatitis B core antibody
AIDS	Acquired immunodeficiency syndrome
ARDS	Acute/adult respiratory distress syndrome
BAL	Bronchoalveolar lavage
BCG	Bacille Calmette-Guérin
CAP	College of American Pathologists
CDC	Centers for Disease Control and Prevention
CJD	Classic Creutzfeldt-Jakob disease
CJD-SS	Creutzfeldt-Jakob Disease Surveillance System
CMPT	Clinical Microbiology Proficiency Testing
CPE	Cytopathic effect
CPHA	Canadian Public Health Agency
CPHLN	Canadian Public Health Laboratory Network
CPSP	Canadian Paediatric Surveillance Program
CRI	Congenital rubella infection
CRS	Congenital rubella syndrome
CSF	Cerebrospinal fluid
DFA	Direct fluorescent antibody
DNA	Deoxyribonucleic acid
EEG	Electroencephalogram
EIA	Enzyme immunoassay, includes enzyme-linked immunosorbent assay
EM	Electron microscopy
ERAP	Emergency Response Assistance Plan
FFI	Familial fatal insomnia
GSS	Gerstmann-Straussler-Scheinker disease
HAV	Hepatitis A virus
HBsAg	Hepatitis B surface antigen
HBV	Hepatitis B virus
HCV	Hepatitis C virus
Hib	<i>Haemophilus influenzae</i> type b
HIV	Human immunodeficiency virus
iCJD	Iatrogenic Creutzfeldt-Jakob disease

ICT	Immunochromatography
IF	Immunofluorescence
IFA	Indirect fluorescent antibody
IgG	Immunoglobulin G
IgM	Immunoglobulin M
ILI	Influenza-like illness
IMD	Invasive meningococcal disease
MMR	Measles, mumps, rubella
NAT	Nucleic acid test, including but not limited to nucleic acid amplification tests
NLHRS	National Laboratory for HIV Reference Services
NML	National Microbiology Laboratory
OPV	Oral polio vaccine
PCR	Polymerase chain reaction
PFGE	Pulse field gel electrophoresis
PHAC	Public Health Agency of Canada
PHEIC	Public Health Emergency of International Concern <sup>1</sup>
PHL	Public health laboratory
PRN	Plaque reduction neutralization
PrP	Prion protein
RNA	Ribonucleic acid
RT-PCR	Reverse-transcriptase polymerase chain reaction
SAF	Scrapie associated fibrils
SGOT	Serum glutamic oxaloacetic transaminase
SGPT	Serum glutamate pyruvate transaminase
sCJD	Sporadic Creutzfeldt-Jakob disease
TTP	Thrombocytopenia purpura
vCJD	Variant Creutzfeldt-Jacob disease
VDRL	Venereal disease research laboratory (slide test)
VHF	Viral hemorrhagic fever
VTEC	Verotoxin-producing <i>Escherichia coli</i>
VZV	Varicella-zoster virus
WHO	World Health Organization
WNAI	West Nile virus asymptomatic infection
WN Non-NS	West Nile virus non-neurological syndrome
WNNS	West Nile virus neurological syndrome
WNV	West Nile virus

1 PHEIC is defined as an extraordinary event that constitutes a public health risk to other States through the international spread of disease, and may require a coordinated international response.

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## Introduction

The purpose of this document is to provide updated case definitions for communicable diseases under national surveillance, diseases that federal, provincial and territorial public health officials have agreed to make nationally notifiable. Note that disease reporting to provincial/territorial public health officials is mandatory for selected diseases according to respective provincial/territorial legislation and that notification to the federal level is voluntary and by mutual agreement. The list of nationally notifiable diseases was revised and was published in 2006<sup>(1,2)</sup>; note that, since then, it was agreed to make invasive *Haemophilus influenzae* disease, type non-b, notifiable in addition to invasive *Haemophilus influenzae* disease, type b.

The process for updating the case definitions was extensive and included laboratory, clinical and epidemiologic aspects; it involved federal and provincial representatives as well as subject matter experts. For the epidemiologic and clinical aspects of the case definitions, input was provided by a federal/provincial/territorial consultative process undertaken and coordinated by the Public Health Agency of Canada (PHAC) (the Centre for Communicable Diseases and Infection Control, the Centre for Food-borne, Environmental and Zoonotic Infectious Diseases, and the Centre for Immunization and Respiratory Infectious Diseases) with approval by the Communicable Disease Control Expert Group of the Pan-Canadian Public Health Network.

For the laboratory aspects, input and approval was provided by the Laboratory Standardization Subcommittee of the Canadian Public Health Laboratory Network (CPHLN), which is an expert group of the Pan-Canadian Public Health Network involving collaboration between the National Microbiology Laboratory of PHAC and the provincial public health laboratories. Laboratory criteria for disease confirmation are based on

current national and international guidelines, literature review and diagnostic laboratory technology and practices. These generally include a variety of markers based on the range of current diagnostic laboratory technology, availability of commercial and in-house test kits, and current laboratory practices and expertise across the country. All tests that are used to detect and confirm communicable diseases in accordance with case definitions should undergo a standard validation process before being introduced to ensure that they are accurate and reproducible. Further information on laboratory testing issues, including supplemental laboratory evidence for confirming nationally notifiable diseases, may be obtained from the National Microbiology Laboratory or the CPHLN.

## Goals of disease notification for national surveillance purposes

1. To facilitate the control of the diseases under surveillance by identifying the following:
  - a. prevailing incidence levels and trends to assist in the development of feasible objectives for prevention and control of the disease and the evaluation of control programs;
  - b. epidemiologic patterns and risk factors associated with the disease to assist in the development of intervention strategies;
  - c. outbreaks, for the purpose of timely investigation and control.
2. To satisfy the needs of government (including regulatory programs), health care professionals, voluntary agencies and the public for information on risk patterns and trends in the occurrence of communicable diseases.

## Program characteristics

If a decision is made to put a disease under surveillance, then the surveillance or notification program should meet the following criteria:

- a. use of a uniform case definition across Canada;
- b. collection of sufficient, appropriate epidemiologic data on each case to fulfil program goals;
- c. timely transmission of these data from local to provincial and federal agencies for analysis (personal identifying information should be removed before the data reach the federal level);
- d. use of the data to enhance control programs and assist in the development of realistic objectives for reducing the number of preventable cases;
- e. periodic evaluation of the effectiveness and economic benefit of the surveillance system and progress towards control of the disease.

It is acknowledged that full implementation of these steps will proceed at different rates in different jurisdictions.

## Notification of diseases under national surveillance

Before 1990, each jurisdiction had its own set of communicable disease case definitions, and comparability across jurisdictions was difficult, if not impossible. In March 1991, the federal government, in conjunction with the provincial and territorial epidemiologists, published disease-specific case definitions for communicable diseases under national surveillance. For the first time, these case definitions provided standardized

criteria for the notification of cases under national surveillance. A second edition of revised case definitions was published in 2000<sup>(3)</sup>. This current document represents a third edition; however, in the future it will be updated on a case-by-case, as needed basis rather than en bloc, and so future revisions will be posted on the PHAC website at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/index-eng.php>

In most instances, only confirmed cases are notified to the federal Notifiable Disease Surveillance System of the Centre for Communicable Diseases and Infection Control, PHAC. Situations in which probable, possible or suspect cases are to be notified are noted within the case definitions for the relevant diseases. A combination of clinical, laboratory and epidemiologic criteria is used to classify a confirmed case. Some case definitions include a brief clinical description; however, this information is intended for the purpose of classifying cases and should not be used for clinical diagnoses. Probable, possible and suspect cases may be described to assist local public health authorities in carrying out their public health mandate, such as outbreak investigation and contact tracing. Physicians diagnosing a case of a specific (notifiable) disease report their clinical diagnosis with/without laboratory confirmation to local health authorities, and these authorities are responsible for determining whether the case meets the surveillance case definition before they proceed with official notification. When there is uncertainty because data are missing or the results are inconclusive, the case may be reported in the appropriate category (probable, possible, suspect), but if the status is changed later as a result of additional information, this change must be made in the notification system to avoid duplicate counting of cases.

## The “core set” of variables

Federal, provincial and territorial officials have previously agreed on the essential or core epidemiologic data to be submitted for each notified case: province, disease, age, sex, status of case (confirmed, probable, possible or suspect), episode dates, episode identifier and geographic indicator. For some diseases, there has been further agreement to provide an additional set of variables (“minimum data set”).

## Notification of case-by-case data

It has been previously agreed that notifications should be made on a case-by-case or “line-listed” basis in which each case is notified on an individual basis with the core set of variables. However, some provinces/territories are still making the transition from supplying aggregate data to case-by-case data. All case notification to the federal level is non-nominal.

## Protocols for interprovincial/territorial notification of disease

- The jurisdiction where the disease is diagnosed normally notifies the federal level or has the responsibility to make sure that the disease is notified by some jurisdiction.
- The jurisdiction of diagnosis informs the jurisdiction of residence if public health action (e.g. contact management, source of identifications) is necessary in the jurisdiction of residence.
- When cases resident in one jurisdiction are being diagnosed in another (such as in border towns) and thereby significantly affecting the incidence rate in the second jurisdiction, the two jurisdictions may make a disease-specific

agreement that the diagnosing jurisdiction does not count the cases but does notify the residence jurisdiction, which will count them.

- Cases moving from one jurisdiction to another while still under surveillance for a notifiable disease are not re-counted in the new jurisdiction.

## National analysis and dissemination

PHAC will publish annual surveillance summaries. Provisional data for the most recent notification period will continue to be published each quarter in *Canada Communicable Disease Report*. Disease incidence and rates of infection will be available on PHAC’s website under Notifiable Diseases On-Line and can be accessed at the following address: [http://dsol-smed.phac-aspc.gc.ca/dsol-smed/ndis/list\\_e.html](http://dsol-smed.phac-aspc.gc.ca/dsol-smed/ndis/list_e.html)

## References

1. Doherty J-A. *Final report and recommendations from the National Notifiable Diseases Working Group*. *CCDR* 2006;32(19):211-25.
2. *Erratum: Final report and recommendations from the National Notifiable Diseases Working Group*. *CCDR* 2008;34:24-5.
3. Advisory Committee on Epidemiology, Division of Disease Surveillance, Bureau of Infectious Diseases. *Case definitions for diseases under national surveillance*. *CCDR* 2000;26(S3).

## **Enteric, Food and Waterborne Diseases**

- Botulism
- Campylobacteriosis
- Cholera
- Cryptosporidiosis
- Cyclosporiasis
- Giardiasis
- Hepatitis A
- Invasive Listeriosis
- Norovirus Infection
- Paralytic Shellfish Poisoning
- Salmonellosis
- Shigellosis
- Typhoid
- Verotoxigenic Escherichia coli Infection

## Botulism

Nationally notifiable since 1933, 1940 onward

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level.

### 3.0 Case Classification

#### 3.1 Confirmed case

A confirmed case requires laboratory definitive evidence with clinical evidence **or, in the case of foodborne botulism**, clinical evidence and consumption of the same suspect food as an individual who has laboratory-confirmed botulism.

#### Foodborne Botulism (Either 1 or 2)

1) Laboratory confirmation of intoxication with clinical evidence:

detection of botulinum toxin in serum, stool, gastric aspirate or food

OR

isolation of *Clostridium botulinum* from stool or gastric aspirate

2) Clinical evidence and indication that the client ate the same suspect food as an individual with laboratory-confirmed botulism

#### Wound Botulism

Laboratory confirmation of infection:  
laboratory detection of botulinum toxin in serum  
OR

isolation of *C. botulinum* from a wound  
AND

presence of a freshly infected wound in the 2 weeks before symptoms and no evidence of consumption of food contaminated with *C. botulinum*

#### Infant Botulism

Laboratory confirmation with symptoms compatible with botulism in a person less than one year of age:

detection of botulinum toxin in stool or serum  
OR

isolation of *C. botulinum* from the patient's stool or at autopsy

#### Colonization Botulism

Laboratory confirmation with symptoms compatible with botulism in a patient aged 1 year or older with severely compromised gastrointestinal tract functioning (i.e. abnormal bowel) due to various diseases, such as colitis, or intestinal bypass procedures, or in association with other conditions that may create local or widespread disruption in the normal intestinal flora:

detection of botulinum toxin in stool or serum  
OR

isolation of *C. botulinum* from the patient's stool or at autopsy

#### 3.2 Probable case

##### Foodborne

A probable case requires clinical evidence and consumption of a suspect food item in the incubation period (12-48 hours).

## Botulism

Nationally notifiable since 1933, 1940 onward

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### 4.0 Laboratory Evidence

#### 4.1 Laboratory Confirmation (from CPHLN document)

Any of the following will constitute a case of botulism:

Detection of botulinum toxin, with or without culture

Isolation of *C. botulinum*

#### 4.2 Approved/Validated Tests

Standard culture for *C. botulinum* with demonstration of neurotoxin

*C. botulinum* neurotoxin mouse bioassay

#### 4.3 Indications and limitations

In wound and foodborne botulism *C. botulinum* neurotoxin may not be detectable in serum. Administration of antitoxin prior to withdrawal of blood will result in a negative assay.

While some strains of *C. botulinum* type C may not produce neurotoxin, two other species of the genus, *C. baratii* and *C. butyricum* may produce the neurotoxin.

Culture without toxin assay by mouse bioassay is not useful. Group I *C. botulinum* cannot be distinguished from *C. sporogenes* without toxin assay.

Isolates and/or clinical specimens should be referred to the National Botulism Reference Service or the British Columbia Centre for Disease Control

EIA for botulinum toxin is not as sensitive as the mouse bioassay and therefore should not replace the mouse bioassay for neurotoxin detection in clinical specimens; however, EIA could be used to detect neurotoxin production from cultures.

### 5.0 Clinical Evidence

**Foodborne:** Clinical illness is characterized by blurred vision, dry mouth and difficulty swallowing and speaking. Descending and symmetric paralysis may progress rapidly, often requiring respiratory support.

**Wound:** Clinical illness is characterized by diplopia, blurred vision and bulbar weakness. Symmetric paralysis may progress rapidly.

**Infant:** Clinical illness in infants is characterized by constipation, loss of appetite, weakness, altered cry and loss of head control

### 6.0 ICD Code(s)

#### ICD-10 Code(s)

A05.1 Botulism (Classical foodborne intoxication due to *Clostridium botulinum*)

#### ICD-9/ICD-9CM Code(s)

005.1 Botulism

### 7.0 Type of International Reporting

Reportable to WHO under International Health Regulations

## **Botulism**

Nationally notifiable since 1933, 1940 onward

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### **8.0 Comments**

One case is considered an outbreak.  
Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### **9.0 References**

Protocol under development (Centre for Food-borne, Enteric and Zoonotic Infectious Diseases

CDC Notifiable Disease Case Definitions  
Taillac PP, Kim J. CBRNE-Botulism. Last updated June 2006. Available at:  
<http://www.emedicine.com/emerg/topic64.htm>

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## **Campylobacteriosis**

Nationally notifiable since 1986

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### **1.0 National Notification**

Only *confirmed cases* of disease should be notified.

### **2.0 Type of Surveillance**

Routine case-by-case notification to the federal level.

### **3.0 Case Classification**

#### **3.1 Confirmed case**

Laboratory confirmation of infection with or without symptoms:

- isolation of *Campylobacter sp.* from an appropriate clinical specimen

#### **3.2 Probable case**

Clinical illness in a person who is epidemiologically linked to a confirmed case

### **4.0 Laboratory Comments**

Further strain characterization is indicated for epidemiologic, public health and control purposes.

### **5.0 Clinical Evidence**

Clinical illness is characterized by diarrhea, abdominal pain, malaise, fever, nausea and/or vomiting

### **6.0 ICD Code(s)**

#### **6.1 ICD-10 Code(s)**

A04.5 *Campylobacter enteritis*

#### **6.2 ICD-9/ICD-9CM Code(s)**

008.43 *Campylobacter*

### **7.0 Type of International Reporting**

### **8.0 Comments**

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### **9.0 References**

**Date of Last Revision/Review:** May 2008

## Cholera

Nationally notifiable since 1974

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical evidence of illness with laboratory confirmation of infection through isolation of cholera toxin producing *Vibrio cholerae* serotype O1 or O139 from vomitus or stool

#### 3.2 Probable case

Clinical evidence of illness in a person who is epidemiologically linked to a confirmed case

### 4.0 Laboratory Comments

Further strain characterization, including antibiotic susceptibility testing, is indicated for epidemiologic, public health and control purposes.

### 5.0 Clinical Evidence

Cholera is characterized by acute watery diarrhea and/or vomiting. The severity of illness may vary.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

A00.0

#### 6.2 ICD-9 Code(s)

001.0

### 7.0 Type of International Reporting

Mandatory reporting to the WHO if illness constitutes a public health emergency of international concern (PHEIC), as defined by the World Health Organization *International Health Regulations* (2005).

### 8.0 Comments

In order to have a high reporting specificity, the WHO limits the case definition of cholera to those aged  $\geq 5$  years.

Illnesses caused by strains of *V. cholerae* other than toxigenic *V. cholerae* O1 or O139 should not be reported as cases of cholera.

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### 9.0 References

*Case definitions for diseases under national surveillance*. CDR 2000;26S3. Retrieved May 2008, from <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/00vol26/26s3/index.html>

## **Cholera**

Nationally notifiable since 1974

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Centers for Disease Control and Prevention. MMWR 1997. *Case definitions for infectious conditions under public health surveillance*. Retrieved May 29, 2008, from [http://www.cdc.gov/ncphi/diss/nndss/casedef/cholera\\_current.htm](http://www.cdc.gov/ncphi/diss/nndss/casedef/cholera_current.htm)

Communicable Diseases Network Australia. 2004. *Interim surveillance case definitions for the Australian National Notifiable Diseases Surveillance System*. Version 1.1. p. 10. Retrieved on May 29, 2008, from [http://www.health.gov.au/internet/wcms/publishing.nsf/Content/cda\\_surveil-nndss-dislist.htm#casedefs](http://www.health.gov.au/internet/wcms/publishing.nsf/Content/cda_surveil-nndss-dislist.htm#casedefs)

World Health Organization. Department of Communicable Disease Surveillance and Response (October 1999). *WHO Recommended Surveillance Standards*. 2<sup>nd</sup> ed. WHO/CDS/CSR/ISR/99.2. Retrieved on May 29, 2008, from [www.who.int/csr/resources/publications/surveillance/whocdscsr992.pdf](http://www.who.int/csr/resources/publications/surveillance/whocdscsr992.pdf)

**Date of Last Revision/Review:** May 2008.

## Cryptosporidiosis

Nationally notifiable since 2000

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Laboratory confirmation of infection with or without symptoms from an appropriate clinical specimen (e.g. stool, intestinal fluid or small bowel biopsy):

- demonstration of *Cryptosporidium* oocysts
- OR
- detection of *Cryptosporidium* DNA
- OR
- demonstration of *Cryptosporidium* antigen by an approved method (e.g. EIA, immunochromatographic – ICT)

#### 3.2 Probable case

Clinical illness in a person who is epidemiologically linked to a confirmed case

### 4.0 Laboratory Comments

While *Cryptosporidium parvum* and *Cryptosporidium hominis* are the leading causes of cryptosporidiosis, other species are known to cause diarrheal illness in immunocompromised individuals.

### 5.0 Clinical Evidence

Clinical illness is characterized by diarrhea (often profuse and watery), abdominal cramps, anorexia, fever, nausea, general malaise and vomiting.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

A07.2 Cryptosporidiosis

#### 6.2 ICD-9/ICD-9CM Code(s)

007.4 Cryptosporidiosis

### 7.0 Type of International Reporting

### 8.0 Comments

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### 9.0 References

**Date of Last Revision/Review:** May 2008

## Cyclosporiasis

Nationally notifiable since 2000

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Laboratory confirmation of infection in a person with or without clinical illness:

- demonstration of *Cyclospora cayetanensis* oocysts in stool, duodenal/jejunal aspirate or small bowel biopsy

#### 3.2 Probable case

Clinical illness in a person with evidence of:

- an epidemiologic link to a confirmed case either by consumption of the same food or exposure to food known to be handled by a confirmed case

OR

- a history of travel to a cyclospora-endemic area

### 4.0 Laboratory Comments

### 5.0 Clinical Evidence

Clinical illness is characterized by watery diarrhea, loss of appetite, weight loss, abdominal bloating and cramping, increased flatus, nausea, fatigue and low-grade fever. Vomiting may also be noted. Relapses and asymptomatic infections can

occur. Some evidence suggests that symptoms may be more severe and long-lasting in immunocompromised individuals.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

A07.8 Other specified protozoal intestinal diseases (includes *Cyclospora cayetanensis*)

#### 6.2 ICD-9/ICD-9CM Code(s)

007.5 Cyclosporiasis

### 7.0 Type of International Reporting

### 8.0 Comments

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

The disease is not endemic in Canada; therefore, cases should be investigated as most likely associated with imported food or travel.

### 9.0 References

Centers for Disease Control and Prevention. MMWR 1997. *Case definitions for infectious conditions under public health surveillance*. Retrieved May 2008, from [http://www.cdc.gov/ncphi/diss/nndss/casedef/cyclosporiasis\\_current.htm](http://www.cdc.gov/ncphi/diss/nndss/casedef/cyclosporiasis_current.htm)

**Date of Last Revision/Review:** May 2008

## Giardiasis

Nationally notifiable from 1983

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Laboratory confirmation of infection with or without symptoms from stool, duodenal fluid or small bowel biopsy specimen:

- demonstration of *Giardia lamblia*

OR

- demonstration of *Giardia lamblia* antigen

#### 3.2 Probable case

Clinical illness in a person who is epidemiologically linked to a confirmed case

### 4.0 Laboratory Comments

### 5.0 Clinical Evidence

Clinical illness is characterized by diarrhea, abdominal cramps, bloating, weight loss, fatigue or malabsorption.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

A07.1 Giardiasis (lambliasis)

### 6.2 ICD-9/ICD-9CM Code(s)

007.1 Giardiasis

### 7.0 Type of International Reporting

### 8.0 Comments

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### 9.0 References

**Date of Last Revision/Review:** May 2008

## Hepatitis A

Nationally notifiable from 1927-1958, 1969 onwards

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Laboratory confirmation of infection in the absence of recent vaccination:

- detection of immunoglobulin M (IgM) antibody to hepatitis A virus (anti HAV)

AND

- Acute clinical illness (see section 5.0)

OR

- An epidemiologic link to a person with laboratory-confirmed hepatitis A infection.

#### 3.2 Probable case

Acute clinical illness in a person without laboratory confirmation of infection who is epidemiologically linked to a confirmed case

### 4.0 Laboratory Comments

IgM positive results can be a true positive but reflect a remote infection, as HAV-IgM can remain detectable for years after an acute infection because of trailing IgM or the non-disappearance of anti-HAV IgM after recent infection. Acute/recent infection should be confirmed with clinical history symptoms and by repeat titre after 7 to 10 days.

### 5.0 Clinical Evidence

Acute clinical illness is characterized by discrete onset of symptoms, including fever, malaise, anorexia, nausea and abdominal pain followed by jaundice or elevated aminotransferase levels within a few days.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

B15.0 Hepatitis A with hepatic coma

B15.9 Hepatitis A without hepatic coma  
[Hepatitis A (acute)(viral) not otherwise specified (NOS)]

#### 6.2 ICD-9/ICD-9CM Code(s)

070.0 Viral hepatitis A with hepatic coma

070.1 Viral hepatitis A without mention of hepatic coma

### 7.0 Type of International Reporting

### 8.0 Comments

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### 9.0 References

**Date of Last Revision/Review:** May 2008

## Invasive Listeriosis

Nationally notifiable since 2007

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Laboratory confirmation of infection with symptoms:

- isolation of *Listeria monocytogenes* from a normally sterile site (e.g. blood, cerebral spinal fluid, joint, pleural or pericardial fluid)
- OR
- in the setting of miscarriage or stillbirth, isolation of *L. monocytogenes* from placental or fetal tissue (including amniotic fluid and meconium)

### 4.0 Laboratory Comments

### 5.0 Clinical Evidence

Invasive clinical illness is characterized by meningitis or bacteremia. Infection during pregnancy may result in fetal loss through miscarriage, stillbirth, neonatal meningitis or bacteremia.

### 6.0 ICD Code(s)

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\* Do not live in a common household, excluding institutions

### 6.1 ICD-10 Code(s)

A32 Listeriosis (*includes* listerial foodborne infection; *excludes* neonatal (disseminated) listeriosis P37.2)

A32.1 Listerial meningitis and meningoencephalitis (Listerial: meningitis (G01); meningoencephalitis (G05.0))

A32.7 Listerial septicaemia

A32.8 Other forms of listeriosis (Listerial: cerebral arteritis (I68.1); endocarditis (I39.8), Oculoglandular listeriosis)

A32.9 Listeriosis, unspecified

### 6.2 ICD-9/ICD-9CM Code(s)

027.0 Listeriosis (excluding congenital listeriosis (771.2))

Infection by *Listeria monocytogenes*

Septicemia by *Listeria monocytogenes*

Use additional code to identify manifestations, as meningitis (320.7)

### 7.0 Type of International Reporting

### 8.0 Comments

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### 9.0 References

**Date of Last Revision/Review:** May 2008



## **Norovirus**

Nationally notifiable since 2007

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### **1.0 National Notification**

Only outbreaks should be notified.

### **2.0 Type of Surveillance**

Outbreak reports

### **3.0 Case Classification – Outbreak**

#### **3.1 Confirmed Outbreak**

Two or more cases of clinical illness compatible with norovirus that can be epidemiologically linked to one another (i.e. associated by exposure with onsets within a 1-3 day period), at least one of which is laboratory confirmed:

#### **Community outbreak:**

Two or more unrelated\* cases of illness compatible with norovirus that can be epidemiologically linked to one another

#### **Institutional outbreak:**

Two or more cases of clinical illness compatible with norovirus that are epidemiologically linked in an institutional setting

### **4.0 Laboratory Comments**

### **5.0 Clinical Evidence**

Clinical illness is characterized by acute onset of nausea, vomiting, diarrhea, abdominal pain, myalgia, headache, malaise, low-grade fever or a combination of these symptoms, lasting 24 to 48 hours.

### **6.0 ICD Code(s)**

#### **6.1 ICD-10 Code(s)**

A08.1 Acute gastroenteropathy due to Norwalk agent

Small round structured virus enteritis

#### **6.2 ICD-9/ICD-9CM Code(s)**

008.63 Norwalk virus  
Norwalk-like agent

### **7.0 Type of International Reporting**

### **8.0 Comments**

### **9.0 References**

### **Date of Last Revision/Review:**

November 2008

## Paralytic Shellfish Poisoning

Nationally notifiable since 2007

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical illness and:

- detection of saxitoxin in epidemiologically related, ingested shellfish

OR

- detection of high levels of dinoflagellates associated with shellfish poisoning in water from which epidemiologically related shellfish were gathered

#### 3.2 Probable case

Clinical illness within 12 hours of consumption of bivalve mollusk shellfish (e.g. oysters, clams, mussels)

### 4.0 Laboratory Comments

### 5.0 Clinical Evidence

Clinical illness is characterized by neurological symptoms such as paresthesia and/or paralysis involving the mouth and extremities, which may be accompanied by gastrointestinal symptoms.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

T61 Toxic effect of noxious substances eaten as seafood

T61.2 Other fish and shellfish poisoning

#### 6.2 ICD-9/ICD-9CM Code(s)

988 Toxic effect of noxious substances eaten as food

988.0 Fish and shellfish

### 7.0 Type of International Reporting

### 8.0 Comments

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### 9.0 References

**Date of Last Revision/Review:** May 2008

## Salmonellosis

Nationally notifiable since 1958

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Laboratory confirmation of infection with or without clinical illness:

- isolation of *Salmonella* sp. (excluding *Salmonella typhi*) from an appropriate clinical specimen (e.g. sterile site, deep tissue wounds, stool, vomit or urine)

#### 3.2 Probable case

Clinical illness in a person who is epidemiologically linked to a confirmed case

### 4.0 Laboratory Comments

Further strain characterization (e.g. serotyping, phage typing, PFGE typing) is indicated for epidemiologic, public health and control purposes.

### 5.0 Clinical Evidence

Clinical illness is characterized by headache, diarrhea, abdominal pain, nausea, fever and sometimes vomiting. Asymptomatic infections may occur, and the organism may cause extra-intestinal infections.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

- A01.1 Paratyphoid Fever A
- A01.2 Paratyphoid Fever B
- A01.3 Paratyphoid Fever C
- A01.4 Paratyphoid Fever, unspecified  
Infection due to *Salmonella paratyphi* not otherwise specified (NOS)
- A02 Other *Salmonella* infections (excluding *S. typhi* and *S. paratyphi*)
  - A02.0 *Salmonella* enteritis Salmonellosis
  - A02.1 *Salmonella* septicemia
  - A02.2 Localized salmonella infections
  - A02.8 Other specified salmonella infections
  - A02.9 *Salmonella* infection, unspecified

#### 6.2 ICD-9/ICD-9CM Code(s)

- 002.1 Paratyphoid Fever A
- 002.2 Paratyphoid Fever B
- 002.3 Paratyphoid Fever C
- 002.4 Paratyphoid Fever, unspecified
- 003 Other *Salmonella* infections (excluding *S. typhi* and *S. paratyphi*)
  - 003.0 *Salmonella* gastroenteritis Salmonellosis
  - 003.1 *Salmonella* septicemia
  - 003.2 Localized *Salmonella* infections
  - 003.8 Other specified *Salmonella* infections
  - 003.9 *Salmonella* infection, unspecified

### 7.0 Type of International Reporting

### 8.0 Comments

Includes *S. Paratyphi* (paratyphoid fever)

## **Salmonellosis**

Nationally notifiable since 1958

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Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### **9.0 References**

**Date of Last Revision/Review:** May 2008

## Shigellosis

Nationally notifiable since 1924

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Laboratory confirmation of infection with or without clinical illness:

- isolation of *Shigella* sp. from an appropriate clinical specimen (e.g. sterile site, deep tissue wounds, stool, vomit or urine)

#### 3.2 Probable case

Clinical illness in a person who is epidemiologically linked to a confirmed case

### 4.0 Laboratory Comments

Further strain characterization (e.g., drug resistance testing, serotyping, PFGE typing) is indicated for epidemiologic, public health and control purposes.

### 5.0 Clinical Evidence

Clinical illness is characterized by diarrhea, fever, nausea, vomiting cramps and tenesmus. Asymptomatic infections may occur.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

- A03 Shigellosis
- A03.0 Shigellosis due to *Shigella dysenteriae* (Group A shigellosis)
- A03.1 Shigellosis due to *Shigella flexneri* (Group B shigellosis)
- A03.2 Shigellosis due to *Shigella boydii* (Group C shigellosis)
- A03.3 Shigellosis due to *Shigella sonnei* (Group D shigellosis)
- A03.8 Other shigellosis
- A03.9 Shigellosis, unspecified (Bacillary dysentery not otherwise specified (NOS))

#### 6.2 ICD-9/ICD-9CM Code(s)

- 004 Shigellosis (includes bacillary dysentery)
- 004.0 *Shigella dysenteriae*  
Infection by group A *Shigella* (Schmitz) (Shiga)
- 004.1 *Shigella flexneri*  
Infection by group B *Shigella*
- 004.2 *Shigella boydii*  
Infection by group C *Shigella*
- 004.3 *Shigella sonnei*  
Infection by group D *Shigella*
- 004.8 Other specified *Shigella* infections
- 004.9 Shigellosis, unspecified

### 7.0 Type of International Reporting

### 8.0 Comments

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

## **Shigellosis**

Nationally notifiable since 1924

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### **9.0 References**

**Date of Last Revision/Review:** May 2008

## Typhoid

Nationally notifiable since 1924-1952, 1969

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### 1.0 National Notification:

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical illness with laboratory confirmation of infection:

- isolation of *Salmonella typhi* from an appropriate clinical specimen

### 4.0 Laboratory Comments

Further strain characterization is required for epidemiologic, public health and control purposes.

### 5.0 Clinical Evidence

Typhoid is characterized by insidious onset of sustained fever, headache, malaise, anorexia, splenomegaly, constipation or diarrhea, and non-productive cough. Relative bradycardia and rose spots (less than 25% of individuals) may be seen. Atypical presentations occur, and the severity of the illness varies.

Chronic carrier state (< 5% of population) is usually linked to the biliary or urinary tract and should be distinguished from short-term faecal carriage.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

A01.0 Typhoid fever

#### 6.2 ICD-9 Code(s)

002.0 Typhoid fever

### 7.0 Type of International Reporting

### 8.0 Comments

Paratyphoid fever caused by *Salmonella paratyphi* A, B and C is reported under *Salmonella* sp.

### 9.0 References

*Case definitions for diseases under national surveillance*. CCDDR 2000;26(Suppl 3): 55.

Centers for Disease Control and Prevention. MMWR 1997. *Case definitions for infectious conditions under public health surveillance*. Retrieved May 2008, from [http://www.cdc.gov/ncepi/diss/nndss/casedef/typhoid\\_fever\\_current.htm](http://www.cdc.gov/ncepi/diss/nndss/casedef/typhoid_fever_current.htm).

**Date of Last Revision/Review:** May 2008

## Verotoxigenic *Escherichia coli* Infection

Nationally notifiable since 1990

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Laboratory confirmation of infection with or without clinical illness:

- isolation of verotoxin producing *E. coli* from an appropriate clinical specimen (e.g. feces, urine, blood)

OR

- detection of verotoxin antigen or nucleic acid

#### 3.2 Probable case

Clinical illness in a person who is epidemiologically linked to a confirmed case, which would include persons with hemolytic uremic syndrome (HUS)

### 4.0 Laboratory Comments

Further strain characterization, including phage typing and molecular typing (e.g. PFGE typing), is indicated for epidemiologic, public health and control purposes.

### 5.0 Clinical Evidence

Clinical illness is characterized by diarrhea (often bloody) and abdominal cramps; fever is often absent. Illness may be complicated by hemolytic uremic syndrome (HUS), thrombocytopenic purpura (TTP) or pulmonary edema. Asymptomatic infections may also occur, and the microorganism may cause extra-intestinal infections.

### 6.0 CD Code(s)

#### 6.1 ICD-10 Code(s)

A04.3 Enterohaemorrhagic *Escherichia coli* infection (includes VTEC)

#### 6.2 ICD-9/ICD-9CM Code(s)

008.04 Enterohaemorrhagic *Escherichia coli* infection (includes VTEC)

### 7.0 Type of International Reporting

### 8.0 Comments

VTEC includes non-O157 *E. Coli*.

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### 9.0 References

**Date of Last Revision/Review:** May 2008



## **Diseases Transmitted By Respiratory Routes**

- Hantavirus Pulmonary Syndrome
- Invasive Group A Streptococcal Disease
- Invasive Meningococcal Disease
- Invasive Pneumococcal Disease
- Laboratory-Confirmed Influenza (including novel subtypes)
- Legionellosis
- Leprosy
- Severe Acute Respiratory Syndrome (SARS)
- Tuberculosis

# Hantavirus Pulmonary Syndrome

Nationally notifiable since 2000

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## 1.0 National Notification

Only *confirmed cases* of disease should be notified.

- develops within 72 hours of hospitalization in a previously healthy person

OR

## 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

An unexplained illness resulting in death with an autopsy examination demonstrating non-cardiogenic pulmonary edema without an identifiable specific cause of death

## 3.0 Case Classification

### 3.1 Confirmed case

Clinical illness (see section 5.0) with laboratory confirmation of infection:

- Detection of IgM antibodies to hantavirus
- OR
- Detection of a significant (e.g. fourfold or greater) increase in hantavirus-specific IgG
- OR
- Detection of hantavirus RNA in an appropriate clinical specimen
- OR
- Detection of hantavirus antigen by immunohistochemistry

## 6.0 ICD Code(s)

### 6.1 ICD-10

B33.4 Hantavirus (cardio-) pulmonary syndrome

### 6.2 ICD-9 CM

079.81 Hantavirus

## 4.0 Laboratory Comments

## 7.0 Type of International Reporting

## 8.0 Comments

## 5.0 Clinical Evidence

Clinical illness is characterized by:

- a febrile illness (temperature > 38.3°C (101°F) oral) requiring supplemental oxygen

AND

- bilateral diffuse infiltrates (may resemble acute respiratory distress syndrome [ARDS])

AND

## 9.0 References

**Date of Last Revision/Review:** May 2008

## Invasive Group A Streptococcal

Nationally notifiable since 2002

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### 1.0 National Reporting

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level.

Enhanced case-by-case reporting to International Circumpolar Surveillance in participating Northern regions.

### 3.0 Case Classification

#### 3.1 Confirmed case

Laboratory confirmation of infection with or without clinical evidence of invasive disease:

- isolation of group A streptococcus (*Streptococcus pyogenes*) from a normally sterile site (blood, CSF, pleural fluid, pericardial fluid, peritoneal fluid, deep tissue specimen taken during surgery [e.g. muscle collected during debridement for necrotizing fasciitis], bone or joint fluid excluding the middle ear and superficial wound aspirates [e.g. skin and soft tissue abscesses]).

#### 3.2 Probable case

Clinical evidence of invasive disease (see section 5.0) in the absence of another identified aetiology and with non-confirmatory laboratory evidence of infection:

- isolation of group A streptococcus from a non-sterile site
- OR
- positive group A streptococcus antigen detection

### 4.0 Laboratory Comments

### 5.0 Clinical Evidence

Clinical evidence of invasive disease may be manifested as one or more of several conditions:

- streptococcal toxic shock syndrome, which is characterized by hypotension (systolic blood pressure  $\leq 90$  mm Hg in an adult and  $< 5$  percentile for age for children) and at least two of the following signs:
  - o renal impairment (creatinine level  $\geq 177$   $\mu\text{mol/L}$  for adults)
  - o coagulopathy (platelet count  $\leq 100,000/\text{mm}^3$  or disseminated intravascular coagulation)
  - o liver function abnormality (SGOT, SGPT, or total bilirubin  $\geq 2x$  upper limit of normal)
  - o adult respiratory distress syndrome
  - o generalized erythematous macular rash that may desquamate
- soft-tissue necrosis, including necrotizing fasciitis, myositis or gangrene
- meningitis

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

- A40.0 Septicaemia due to group A streptococcus
- A49.1 Streptococcal infection, unspecified
- B95.0 Group A Streptococcus as the cause of diseases classified elsewhere, e.g.:
- A48.3 Toxic shock syndrome
- O85 Puerperal sepsis

## **Invasive Group A Streptococcal** Nationally notifiable since 2002

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M72.6 Necrotizing fasciitis  
M00 Pyogenic arthritis  
G00.2 Streptococcal meningitis

### **6.2 ICD-9/ICD-9CM Code(s)**

038.0 Septicaemia due to group A streptococcus  
041.01 Group A Streptococcal infection of unspecified site and in conditions classified elsewhere, e.g.:  
040.82 Toxic shock syndrome  
670 Major puerperal infection  
728.86 Necrotizing fasciitis  
711.0 Pyogenic arthritis  
320.2 Streptococcal meningitis

### **7.0 Type of International Reporting**

### **8.0 Comments**

Pneumonia with isolation of group A streptococcus (GAS) from a sterile site or from a bronchoalveolar lavage (BAL) when no other cause has been identified, should be regarded as a form of invasive disease for the purposes of public health management; however, as BAL does not provide a sterile site specimen, the latter would not meet the national case definition and would not be notifiable.

The case definitions for invasive group A streptococcal disease provided in this document are for surveillance purposes. Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes. Definitions of cases (sporadic, index, subsequent, severe), close contacts and organization-based outbreaks for the purposes of public health management are

provided in the national *Guidelines for the Prevention and Control of Invasive Group A Streptococcal Disease* (<http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/06vol32/32s2/index.html>).

### **9.0 References**

Public Health Agency of Canada. *Guidelines for the prevention and control of invasive group A streptococcal disease*. *CCDR* 2006;32S2:1-26.

### **10.0 Previous Case Definitions**

*Case definitions for diseases under national surveillance*. *CCDR* 2000;26(Suppl S3).

**Date of Last Revision/Review:** May 2008

## Invasive Meningococcal Disease

Nationally notifiable since 1924

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### 1.0 National Notification

Both *confirmed* and *probable* cases of disease should be notified as of January 1, 2006.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

Enhanced case-by-case notification to the Centre for Immunization and Respiratory Infectious Diseases

Enhanced case-by-case notification to International Circumpolar Surveillance in participating Northern regions

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical evidence of invasive disease (see section 5.0) with laboratory confirmation of infection:

- isolation of *Neisseria meningitidis* from a normally sterile site (blood, CSF, joint, pleural or pericardial fluid)

OR

- demonstration of *N. meningitidis* DNA by an appropriately validated nucleic acid test (NAT) from a normally sterile site

#### 3.2 Probable case

Clinical evidence of invasive disease with purpura fulminans or petechiae, with no other apparent cause and with non-confirmatory laboratory evidence:

- detection of *N. meningitidis* antigen in the CSF

### 4.0 Laboratory Comments

Positive antigen test results from urine and serum samples are unreliable for diagnosing meningococcal disease.

### 5.0 Clinical Evidence

Clinical illness associated with invasive meningococcal disease usually manifests itself as meningitis and/or septicaemia, although other manifestations may be observed (e.g. orbital cellulitis, septic arthritis). Invasive disease may progress rapidly to petechiae or purpura fulminans, shock and death.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

A39 Meningococcal infection

#### 6.2 ICD-9/ICD-9CM Code(s)

036 Meningococcal infection

### 7.0 Type of International Reporting

Notification in the event of a public health emergency is required under the *International Health Regulations* (2005).

### 8.0 Comments

Each jurisdiction will have an existing validation process for the NAT.

## **Invasive Meningococcal Disease**

Nationally notifiable since 1924

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The case definitions for invasive meningococcal disease provided in this document are for routine and enhanced surveillance purposes. Definitions of cases (sporadic, index, subsequent), close contacts, and organization-based and community-based outbreaks for the purposes of public health management are provided in the national *Guidelines for the Prevention and Control of Meningococcal Disease* (<http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/05vol31/31s1/index.html>).

### **9.0 References**

Public Health Agency of Canada. *Guidelines for the prevention and control of meningococcal disease*. CCDR 2005;31S1:1-20.

### **10.0 Previous Case Definitions**

*Canadian Communicable Disease Surveillance System: disease-specific case definitions and surveillance methods*. Can Dis Wkly Rep 1991;17S3.

*Case definitions for diseases under national surveillance*. CCDR 2000;26(S3).

**Date of Last Revision/Review:** May 2008

## Invasive Pneumococcal Disease

Nationally notifiable since 2000

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### 1.0 National Notification

Only confirmed cases of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

Enhanced case-by-case notification to International Circumpolar Surveillance in participating Northern regions

Enhanced active case-by-case notification by paediatric tertiary care hospitals involved in the Immunization Monitoring Program, Active (IMPACT)

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical evidence of invasive disease (see section 5.0) with laboratory confirmation of infection:

- isolation of *Streptococcus pneumoniae* from a normally sterile site (excluding the middle ear and pleural cavity)

OR

- demonstration of *S. pneumoniae* DNA from a normally sterile site (excluding the middle ear and pleural cavity)

#### 3.2 Probable case

Clinical evidence of invasive disease with no other apparent cause and with non-confirmatory laboratory evidence:

- demonstration of *S. pneumoniae* antigen from a normally sterile site (excluding the middle ear and pleural cavity)

### 4.0 Laboratory Comments

Sputum and bronchial lavages are not considered sterile specimens.

Demonstration of *S. pneumoniae* DNA or antigen does not permit determination of serotype. Serotyping is carried out in a reference laboratory and is important for monitoring changes in disease epidemiology, including the impact of vaccination programs and serotype replacement.

### 5.0 Clinical Evidence

Clinical illness associated with invasive disease manifests itself mainly as pneumonia with bacteremia, bacteremia without a known site of infection, and meningitis. Pneumonia without bacteremia is not notifiable.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

- A40.3 Septicaemia due to *S. pneumoniae*
- B95.3 *S. pneumoniae* as the cause of diseases classified elsewhere, e.g.:
  - I30.1 Infective pericarditis
  - K65.0 Acute peritonitis
  - M00.8 Arthritis and polyarthritis due to other specified bacterial agents
- O85 Puerperal sepsis
- P23.6 Congenital pneumonia due to other bacterial agents
- G00.1 Meningitis due to *S. pneumoniae*
- J13 Pneumonia due to *S. pneumoniae*
- M00.1 Pneumococcal arthritis and polyarthritis

## **Invasive Pneumococcal Disease**

Nationally notifiable since 2000

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### **6.2 ICD-9/ICD-9CM Code(s)**

- 038.2 Septicaemia due to *S. pneumoniae*
- 041.2 *S. pneumoniae* of unspecified site and as the cause of diseases classified elsewhere, e.g.:
  - 420.9 Infective pericarditis
  - 711.0 Pyogenic arthritis
- 567.1 Pneumococcal peritonitis
- 320.1 Meningitis due to *S. pneumoniae*
- 481 Pneumonia due to *S. pneumoniae*
- 711.0 Pneumococcal arthritis and polyarthritis

## **7.0 Type of International Reporting**

## **8.0 Comments**

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

## **9.0 References**

Laboratory Centre for Disease Control. *Preventing pneumococcal disease: a Canadian consensus conference*. CCDR 1999;25:25-35.

## **10.0 Previous Case Definitions**

*Case definitions for diseases under national surveillance*. CCDR 2000;26(S3).

**Date of Last Revision/Review:** May 2008

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## Laboratory-Confirmed Influenza (including novel influenza subtypes) Nationally notifiable since 2000

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Aggregate weekly influenza detections reporting by the Respiratory Virus Detection Surveillance System (RVDSS)

Case-by-case notification of laboratory-based epidemiologic information by the RVDSS

Enhanced, active reporting of aggregate and case-by-case data by paediatric tertiary care hospitals involved in the Immunization Monitoring Program, Active (IMPACT)

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical illness with laboratory confirmation of infection:

- isolation of influenza virus from an appropriate clinical specimen
- OR
- demonstration of influenza virus antigen in an appropriate clinical specimen
- OR
- significant rise (e.g. fourfold or greater) in influenza IgG titre between acute and convalescent sera
- OR
- detection of influenza RNA

### 4.0 Laboratory Comments

### 5.0 Clinical Evidence

Clinical illness defined as influenza-like illness (ILI) is characterized as follows: acute onset of respiratory illness with fever and cough and with one or more of the following:

- sore throat
- arthralgia
- myalgia
- prostration that could be due to influenza virus.

In children under 5, gastrointestinal symptoms may also be present. In patients under 5, or 65 and older, fever may not be prominent. Note: Illness associated with novel influenza viruses may present with other symptoms.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

- J10 Influenza due to identified influenza virus
  - J10.0 Influenza with pneumonia, influenza virus identified
  - J10.1 Influenza with other respiratory manifestations, influenza virus identified
  - J10.8 Influenza with other manifestations, influenza virus identified

#### 6.2 ICD-9/ICD-9CM Code(s)

- 487 Influenza
  - 487.0 Influenza with pneumonia
  - 487.1 Influenza with other respiratory manifestations
  - 487.8 Influenza with other manifestations

## **Laboratory-Confirmed Influenza (including novel influenza subtypes)** Nationally notifiable since 2000

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### **7.0 Type of International Reporting**

Enhanced reporting to WHO for any case of human influenza caused by a novel influenza virus or in the event of a public health emergency is required under the *International Health Regulations (2005)*.

### **8.0 Comments**

In addition to the symptoms of ILI noted above, severe ILI may also include complications such as pneumonia, acute respiratory distress syndrome (ARDS), encephalitis or other severe and life-threatening complications.

### **9.0 References**

### **10.0 Previous Case Definitions**

*Case definitions for diseases under national surveillance. CCDCR 2000;26(S3).*

**Date of Last Revision/Review:** May 2008

## Legionellosis

Nationally notifiable since 1986

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level.

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical illness (see section 5.0) with laboratory confirmation of infection:

- isolation of *Legionella* species or detection of the antigen from respiratory secretions, lung tissue, pleural fluid or other normally sterile fluids
- OR
- a significant (e.g. fourfold or greater) rise in *Legionella* species IgG titre between acute and convalescent sera
- OR
- IgG titre > 1:128 against *Legionella* species
- OR
- demonstration of *L. pneumophila* antigen in urine (see section 4.0)

#### 3.2 Probable case

Clinical illness with demonstration of *Legionella* species DNA

### 4.0 Laboratory Comments

Jurisdictions should use a validated antigen detection test, and test interpretation must be in accordance with the manufacturer's instructions.

Most laboratories use culture with biochemical confirmation in conjunction with antigen detection. A limited number of laboratories currently participate in College of American Pathologists (CAP) and Clinical Microbiology Proficiency Testing (CMPT) proficiency testing programs.

Currently very few laboratories use NAT. A proficiency testing program for NAT is indicated.

### 5.0 Clinical Evidence

Legionellosis comprises two distinct illnesses: Legionnaires' disease, characterized by fever, myalgia, cough and pneumonia, and Pontiac fever, a milder illness without pneumonia.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

A48.1 Legionnaire's Disease  
A48.2 Pontiac Fever

#### 6.2 ICD-9/ICD-9CM Code(s)

482.8 Legionnaire's Disease

### 7.0 Type of International Reporting

Notification in the event of a public health emergency is required under the *International Health Regulations* (2005).

### 8.0 Comments

Probable case definitions are provided as guidelines to assist with case finding and public health

## **Legionellosis**

Nationally notifiable since 1986

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management, and are not for national notification purposes.

### **9.0 References**

#### **10.0 Previous Case Definitions**

*Canadian Communicable Disease Surveillance System: disease-specific case definitions and surveillance methods.* Can Dis Wkly Rep 1991;17(S3).

*Case definitions for diseases under national surveillance.* CCDR 2000;26(S3).

**Date of Last Revision/Review:** May 2008

## Leprosy

Nationally notifiable since 1988

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### 1.0 National Notification

Both *confirmed* and *probable* cases of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical evidence of illness with laboratory confirmation:

- positive acid fast stain with typical morphology for *Mycobacterium leprae*
- OR
- histopathological report from skin or nerve biopsy compatible with leprosy

#### 3.2 Probable case

Clinical illness in a person who is epidemiologically linked to a confirmed case

### 4.0 Laboratory Comments

Positive detection for *M. leprae* DNA is considered presumptive.

### 5.0 Clinical Evidence

**Tuberculoid or paucibacillary disease:** one or a few well-demarcated, hypopigmented and anesthetic skin lesions, frequently with active, spreading edges and a clearing centre; peripheral nerve swelling or thickening may also occur.

#### **Lepromatous or multibacillary disease:**

erythematous papules and nodules or an infiltration of the face, hands and feet with lesions in a bilateral and symmetrical distribution that progress to thickening of the skin and loss of normal hair distribution, particularly on the face (madarosis).

**Borderline (dimorphous):** skin lesions characteristic of both the tuberculoid and lepromatous forms.

**Indeterminate:** early lesions, usually hypopigmented macules, without developed tuberculoid or lepromatous features.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s) A30

#### 6.2 ICD-9 Code(s): 030

### 7.0 Type of International Reporting

Elimination or eradication efforts should be reported.

Quarterly and annual reporting of aggregated data to the WHO

### 8.0 Comments

### 9.0 References

*Case definitions for diseases under national surveillance.* CCDR 2000;26(S3): 47.

## **Leprosy**

Nationally notifiable since 1988

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Centers for Disease Control and Prevention. *Case definitions for infectious conditions under public health surveillance*. MMWR 1997;46(No. RR-10):15.

World Health Organization. Department of Communicable Disease Surveillance and Response (October 1999). *WHO Recommended Surveillance Standards*. 2<sup>nd</sup> ed. WHO/CDS/CSR/ISR/99.2.

Retrieved May 29, 2007 from  
[www.who.int/csr/resources/publications/surveillance/whocdscsr992.pdf](http://www.who.int/csr/resources/publications/surveillance/whocdscsr992.pdf)

**Date of Last Revision/Review:** May 2008

## Severe Acute Respiratory Syndrome (SARS)

Nationally notifiable since 2004

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### 1.0 National Reporting

*Confirmed* and *probable* cases of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level.

Immediate notification to PHAC is required if any jurisdiction is investigating a probable case of severe acute respiratory syndrome (SARS) as per the national Severe Respiratory Illness Surveillance Protocol ([http://www.phac-aspc.gc.ca/eri-ire/pdf/02-SRI-Surveillance-Protocol\\_e.pdf](http://www.phac-aspc.gc.ca/eri-ire/pdf/02-SRI-Surveillance-Protocol_e.pdf)).

### 3.0 Case Classification

#### 3.1 Confirmed case

A person with:

- early clinical presentation of SARS, i.e. fever (over 38° C) AND cough or breathing difficulty

AND

- radiographic evidence consistent with SARS, i.e. radiographic evidence of infiltrates consistent with pneumonia or respiratory distress syndrome (RDS)

AND

- laboratory evidence\* of SARS-associated coronavirus (SARS-CoV) infection, i.e. detection of SARS-CoV RNA OR seroconversion OR virus isolation

OR

A deceased person with:

- a history of early clinical presentation of SARS, i.e. fever AND cough or difficulty breathing resulting in death

AND

- autopsy findings consistent with SARS, i.e. evidence of pneumonia or RDS without an alternative identifiable cause

AND

- laboratory evidence\* of SARS-CoV infection, detection of SARS-CoV RNA OR seroconversion OR virus isolation

#### 3.2 Probable case

A person with:

- early clinical presentation of SARS

AND

- radiographic evidence consistent with SARS

AND

- epidemiologic link to a person or place linked to SARS, i.e.
  - o close contact† with a confirmed SARS case within 10 days of onset of symptoms

OR

- o close contact† with a symptomatic person who has laboratory evidence of SARS-CoV infection within 10 days of onset of symptoms

OR

- o residence in, or recent travel or visit to an “area with recent local transmission of SARS” within the 10 days prior to onset of symptoms

OR

- o close contact (including health care providers) with a probable case who has been to an “area with recent local transmission of SARS” within the 10 days prior to onset of symptoms

OR

A deceased person with:

- a history of early clinical presentation of SARS

AND

- autopsy findings consistent with SARS

## Severe Acute Respiratory Syndrome (SARS)

Nationally notifiable since 2004

---

AND

- epidemiologic link to a person or place linked to SARS

OR

A deceased person with:

- a history of early clinical presentation of SARS

AND

- laboratory evidence\* of SARS coronavirus infection

### 4.0 Laboratory Comments

Laboratory confirmation should involve the following:

- detection of SARS-CoV RNA in appropriate samples (with the caveat of confirmation by NML or a designated laboratory)

OR

- serologic detection of SARS-CoV in a convalescent sample taken > 28 days after onset of illness

OR

- seroconversion between acute and convalescent blood samples collected at least 4 weeks apart

### 5.0 Clinical Evidence

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† Close contact means having cared for, lived with or had face-to-face (within 1 metre) contact with, or having had direct contact with respiratory secretions and/or body fluids of, a person with SARS.

\* Laboratory results must be verified by a provincial public health laboratory and/or the National Microbiology Laboratory.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

U04 Severe acute respiratory syndrome [SARS]

U04.9 Severe acute respiratory syndrome, unspecified

#### 6.2 ICD-9/ICD-9CM Code(s)

### 7.0 Type of International Reporting

Notification of any case of SARS is required under the *International Health Regulations* (2005).

### 8.0 Comments

During an outbreak period, persons without x-ray changes (i.e. those who are not severely ill) may have laboratory evidence of SARS-CoV infection if tested as part of an outbreak. These individuals will be considered as “confirmed SARS-CoV infections”, while not meeting the clinical criteria for confirmed cases of “Severe Acute Respiratory Syndrome (SARS)”.

### 9.0 References

#### 10.0 Previous Case Definitions

Public Health Agency of Canada. 2003. *National Case Definitions for the SARS Outbreak Period*. Retrieved May 29, 2007, from [http://www.phac-aspc.gc.ca/sars-sras/sarscasedef\\_e.html](http://www.phac-aspc.gc.ca/sars-sras/sarscasedef_e.html).

**Date of Last Revision/Review:** May 2008



## Tuberculosis

Nationally notifiable since 1924

### 1.0 National Notification

Only *confirmed* cases of disease should be notified.

Whether treatment was started or not, there should be notification of all cases of tuberculosis diagnosed in Canada in the following groups:

- Canadian citizens
- permanent residents
- refugees
- refugee claimants

For temporary residents (visitors, students and people granted work permits) and foreign nationals who are in Canada illegally, notification is to be done only for cases for whom treatment was started in Canada. The province/territory where treatment starts is to be responsible for notification.

### New and re-treatment cases of tuberculosis

#### New Case

No documented evidence or adequate history of previously active tuberculosis

#### Re-treatment Case\*

- Documented evidence or adequate history of previously active TB that was declared cured or treatment completed by current standards

AND

- At least 6 months have passed since the last day of previous treatment†

AND

- Diagnosed with a subsequent episode of TB that meets the active TB case definition

OR

- Documented evidence or adequate history

of previously active TB that cannot be declared cured or treatment completed by current standards

AND

- Inactive‡ for 6 months or longer after the last day of previous treatment†

AND

- Diagnosed with a subsequent episode of TB that meets the active TB case definition

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

A confirmed case can be either of the following:

#### Laboratory confirmed case

Cases with *Mycobacterium tuberculosis* complex demonstrated on culture, specifically *M. tuberculosis*, *M. africanum*, *M. canetti*, *M. caprae*, *M. microti*, *M. pinnipedii* or *M. bovis* (excluding *M. bovis* BCG strain).

\* Prior to 2008 in Canada, re-treatment cases were known as relapsed cases.

† If less than 6 months have passed since the last day of previous treatment and the case was not previously reported in Canada, report as a re-treatment case. If less than 6 months have passed since the last day of previous treatment and the case was previously reported in Canada, do not report as a re-treatment case. Submit an additional "Treatment Outcome of New Active or Re-treatment Tuberculosis Case" form at the end of treatment.

‡ Inactivity for a respiratory TB case is defined as three negative tuberculosis smears and cultures with a three-month duration of stability in serial chest radiographs or a six-month duration of stability in serial chest radiographs. Inactivity for a non-respiratory tuberculosis case is to be documented bacteriologically, radiologically and/or clinically as appropriate to the site of disease.

## Tuberculosis

Nationally notifiable since 1924

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OR

### **Clinically confirmed case**

In the absence of culture proof, cases clinically compatible with active tuberculosis that have, for example:

- chest radiographic changes compatible with active tuberculosis;
- active nonrespiratory tuberculosis (meningeal, bone, kidney, peripheral lymph nodes, etc.);
- pathologic or post-mortem evidence of active tuberculosis;
- favourable response to therapeutic trial of antituberculosis drugs.

### **4.0 Laboratory Comments**

### **5.0 Clinical Evidence**

See above

### **6.0 ICD Code(s)**

#### **6.1 ICD-9 Code(s):**

010, 010.0, 010.1, 010.8, 010.9, 011, 011.0-011.9, 012, 012.0-012.3, 012.8, 013, 013.0, 013.1, 013.8, 013.9, 014, 015, 015.0-015.2, 015.7-015.9, 016, 016.0016.4, 016.9, 017, 017.0-017.8, 018, 018.0, 018.8, 018.9, 137.0-137.4

#### **6.2 ICD-10 Code(s):**

A15, A15.0-15.9, A16, A16.0-A16.9, A17.0, A17.1, A17.8, A18.0-A18.8, A19.0, A19.2, A19.8, A19.9

### **7.0 Type of International Reporting**

Enhanced reporting to WHO by member countries

### **8.0 Comments**

### **9.0 References**

Public Health Agency of Canada. *Case Reporting and Treatment Outcome Form Completion Guidelines*. 2008. Retrieved May 2008, from [http://www.phac-aspc.gc.ca/tbpc-latb/reports\\_e.html](http://www.phac-aspc.gc.ca/tbpc-latb/reports_e.html)

**Date of Last Revision/Review:** September 2008

## **Diseases Transmitted by Direct Contact and Through the Provision of Health Care**

- *Clostridium difficile* associated diarrhea
- Creutzfeldt-Jakob Disease, Classic
- Creutzfeldt-Jakob Disease, Variant
- Group B Streptococcal Disease of the Newborn

## ***Clostridium difficile* associated diarrhea**

Nationally notifiable since 2009

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### **1.0 National Notification**

Only *confirmed cases* of disease should be notified.

### **2.0 Type of Surveillance**

Routine case-by-case notification to the federal level

### **3.0 Case Classification**

#### **3.1 Confirmed case**

Clinical illness (see section 5.0) and laboratory confirmation of infection:

- a positive toxin assay for *C. difficile*

OR

Diagnosis of pseudomembranes on sigmoidoscopy or colonoscopy, or histological/pathological diagnosis of *C. difficile* infection

### **4.0 Laboratory Comments**

### **5.0 Clinical Evidence**

Clinical illness consists of diarrhea or fever, abdominal pain and/or ileus.

Diarrhea is defined as one of the following:

- six watery stools in past 36 hours
- three unformed stools in 24 hours for at least 1 day
- eight unformed stools over 48 hours

### **6.0 ICD Code(s)**

#### **6.1 ICD-10 Code**

A04.7

#### **6.2 ICD-9 Code**

008.45 Colitis due to *C. difficile*

### **7.0 Type of International Reporting**

### **8.0 Comments**

### **9.0 References**

**Date of Last Revision/Review:** May 2008

## Creutzfeldt-Jakob Disease, Classic and Variant

Nationally notifiable since 2000

This section describes the three etiologic subtypes of classic Creutzfeldt-Jakob disease (CJD) (sporadic CJD, iatrogenic CJD and genetic prion diseases) and variant CJD (vCJD)

### A Sporadic Creutzfeldt-Jakob Disease (sCJD)

#### 1.0 National Reporting

Definite, probable and possible cases

#### 2.0 Type of Surveillance

Case-by-case

#### 3.0 Case Classification

##### 3.1 Definite sCJD

Neuropathologically and/or immunocytochemically and/or biochemically confirmed, through observation of one or more neuropathologic features (see Box 1) and no evidence of iatrogenic CJD or genetic human prion disease (see Sections B and C).

##### 3.2 Probable sCJD

Routine investigation should not suggest an alternative diagnosis

3.2.1 Rapidly progressive dementia + at least two features of list I + II (see Box 2)

or

3.2.2 Possible CJD + cerebrospinal fluid positive for 14-3-3 by immunoblot + duration < 2 years

#### Box 1

- I Spongiform encephalopathy in cerebral and/or cerebellar cortex and/or subcortical grey matter
- II Encephalopathy with prion protein (PrP) immunoreactivity in plaque-like and/or diffuse synaptic and/or patchy/perivacuolar patterns, by examination of tissue either directly or with assistance of capillary transfer from paraffin-embedded tissue (PET) to secondary support (PET blot)
- III Presence of scrapie-associated fibrils (SAF) by electron microscopy
- IV Presence of protease-resistant PrP by Western blot

#### Box 2

- I
  - A Myoclonus
  - B Visual disturbances or cerebellar dysfunction (ataxia)
  - C Pyramidal or extrapyramidal features
  - D Akinetic mutism
- II Typical EEG pattern: periodic sharp-wave complexes ca. 1 Hz

##### 3.3 Possible sCJD

Rapidly progressive dementia + two of list I (see Box 2) + duration < 2 years + no electroencephalography (EEG) or atypical EE

## Creutzfeldt-Jakob Disease, Classic and Variant

Nationally notifiable since 2000

### 4.0 Laboratory Comments

See Sections A.3.1, A3.2, A3.3

### 5.0 Clinical Evidence

See Sections A 3.1, A 3.2, A 3.3

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code

A81.0 Creutzfeldt-Jakob disease

#### 6.2 ICD-9 Code

046.1 Jakob-Creutzfeldt disease

### 7.0 Comments

N/A

### 8.0 References

Surveillance Case Definitions for Human Prion Diseases. Retrieved September 2008, from <http://www.cjd.ed.ac.uk/criteria.htm>

## B Iatrogenic CJD (ICJD)

### 1.0 National Reporting

Definite and probable case

### 2.0 Type of Surveillance

Case-by-case

### 3.0 Case Classification

#### 3.1 Definite iCJD

Definite CJD (see Section A, Box 1 for diagnostic criteria) with a recognized risk factor for iatrogenic transmission (see Box 3)

#### 3.2 Probable iCJD

Progressive predominant cerebellar syndrome in a recipient of cadaverically derived human pituitary growth hormone  
OR  
Probable CJD (see Section A.3.2 for diagnostic criteria) with a recognized risk factor for iatrogenic transmission (see Box 3)

#### Box 3

*Note: Assessment of the relevance of any proposed risk factor to disease causation should take into account the timing of the putative exposure in relation to disease onset, especially where the putative exposure is recent. As well, this list is provisional, as the risks of iatrogenic transmission of prion disease by other routes are currently incompletely understood.*

- I Treatment with human cadaveric pituitary growth hormone, human pituitary gonadotrophin or human dura mater graft
- II Corneal graft in which the corneal donor has been classified as having a definite or probable prion disease
- III Neurosurgical exposure to instruments previously used on a patient classified as having definite or probable prion disease

## Creutzfeldt-Jakob Disease, Classic and Variant

Nationally notifiable since 2000

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### 4.0 Laboratory Comments

See Sections B.3.1, B3.2, B3.3

### 5.0 Clinical Evidence

See Sections B 3.1, B 3.2, B 3.3

### 6.0 ICD Code(s)

#### 6.1 ICD-10

A81.0 Creutzfeldt-Jakob disease

#### 6.2 ICD-9

046.1 Jakob-Creutzfeldt disease

### 7.0 Comments

N/A

### 8.0 References

Surveillance Case Definitions for Human Prion Diseases. Retrieved July 2008, from <http://www.cjd.ed.ac.uk/criteria.htm>

## C Genetic Prion Diseases

### 1.0 National Reporting

Definite and probable cases

### 2.0 Type of Surveillance

Case-by-case

### 3.0 Case Classification

### 3.1 Definite Genetic Human Prion Disease

3.1.1 Definite (pathologically confirmed) prion disease + definite or probable prion disease in a first-degree relative

or

3.1.2 Definite prion disease + pathogenic mutation in prion protein gene (*PRNP*) (see Box 4)

or

3.1.3 Typical neuropathologic phenotype of Gerstmann-Sträussler-Scheinker disease (GSS)\*

### 3.2 Probable Genetic Prion Disease

3.2.1 Progressive neuropsychiatric disorder + definite or probable prion disease in a first degree relative

or

3.2.2 Progressive neuropsychiatric disorder + pathogenic mutation in *PRNP* (see Box 4)

### 4.0 Laboratory Comments

See Sections C 3.1, C 3.2, C 3.3

### 5.0 Clinical Evidence

See Sections C 3.1, C 3.2, C 3.3

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\* Presence of multicentric PrP-immunoreactive plaques in cerebral and/or cerebellar cortex, with neuron loss and spongiosis. Other large amorphous plaques or neurofibrillary tangles immunoreactive for PrP have been described in subsets of GSS, but these are associated with less frequent *PRNP* mutations (A117V and F198S). Florid or Kuru plaques are not considered diagnostic for GSS.

## Creutzfeldt-Jakob Disease, Classic and Variant

Nationally notifiable since 2000

### Box 4

- I *PRNP* mutations associated with a neuropathologic phenotype of CJD (see Section A, Box 1): P105T, G114V, R148H, D178N, V180I, V180I+M232R, T183A, T188A, T193I, E196K, E200K, V203I, R208H, V210I, E211Q, M232R; octapeptide repeat insertions (various lengths) and deletion (48 bp)
- II *PRNP* mutations associated with a neuropathologic phenotype of GSS (see previous footnote above): P102L, P105L, A117V, G131V, A133V, Y145Stop, H187R, F198S, D202N, Q212P, Q217R, M232T; octapeptide repeat insertions (various lengths)
- III *PRNP* mutations associated with a neuropathologic phenotype of Familial Fatal Insomnia (FFI): D178N
- IV *PRNP* mutations associated with other neuropathologic phenotypes: I138M, G142S, Q160Stop, T188K, T188R, P238S, M232R; octapeptide repeat insertions (various lengths)

### 6.0 ICD Code(s)

#### 6.1 ICD-10

A81.0 Creutzfeldt-Jakob disease

#### 6.2 ICD-9

046.1 Jakob-Creutzfeldt disease

### 7.0 Comments

N/A

### 8.0 References

Surveillance Case definitions for Human Prion Diseases. Retrieved July 2008, from <http://www.cjd.ed.ac.uk/criteria.htm>

## D Variant Creutzfeldt-Jakob Disease (vCJD)

### 1.0 National Reporting

Definite, probable and possible cases

### 2.0 Type of Surveillance

Case-by-case

### 3.0 Case Classification

#### 3.1 Definite vCJD

IA (see Box 5) and neuropathologic confirmation as per pathologic features (see footnote <sup>a</sup>, Box 5)

#### 3.2 Probable vCJD

I + 4 or 5 criteria of II + IIIA + IIIB (see Box 5)  
or  
I + IVA

#### 3.3 Possible vCJD

I + 4 or 5 criteria of II + IIIA (see Box 5)



## Creutzfeldt-Jakob Disease, Classic and Variant

Nationally notifiable since 2000

### Box 5

- I
    - A Progressive neuropsychiatric disorder
    - B Duration > 6 months
    - C Routine investigations do not suggest alternative diagnosis
    - D No history of potential iatrogenic exposure
    - E No evidence of genetic prion disease
  
  - II
    - A Early psychiatric symptoms<sup>b</sup>
    - B Persistent painful sensory symptoms<sup>c</sup>
    - C Ataxia
    - D Myoclonus or chorea or dystonia
    - E Dementia
  
  - III
    - A EEG does not show typical appearance of sporadic CJD<sup>d</sup> (or no EEG performed) in the early stages of the illness
    - B Bilateral pulvinar high signal on magnetic resonance imaging (MRI) scan<sup>e</sup>
  
  - IV
    - A Tonsil biopsy positive for prion protein immunoreactivity<sup>f</sup>
- a Spongiform change, extensive PrP deposition, florid plaques throughout cerebrum and cerebellum
- b Depression, anxiety, apathy, withdrawal, delusions
- c Frank pain and/or dysaesthesia
- d Generalized triphasic periodic complexes at ca. 1 Hz. Rarely, these may occur in the late stages of vCJD.
- e Relative to the signal intensity of other deep grey matter nuclei and cortical grey matter
- f Tonsil biopsy is not recommended routinely or in cases with EEG appearance typical of sporadic CJD, but may be useful in suspect cases in which the clinical features are compatible with vCJD and MRI does not show bilateral pulvinar high signal.

### 4.0 Laboratory Comments

See Sections D 3.1, D 3.2, D 3.3

### 5.0 Clinical Evidence

See Sections D 3.1, D 3.2, D 3.3

### 6.0 ICD Code(s)

#### 6.1 ICD-10

A81.0 Creutzfeldt-Jakob disease

#### 6.2 ICD-9

046.1 Jakob-Creutzfeldt disease

### 7.0 Comments

N/A

### 8.0 References

Surveillance Case definitions for Human Prion Diseases. Retrieved July 2008, from <http://www.cjd.ed.ac.uk/criteria.htm>

## Group B Streptococcal Disease of the Newborn

Nationally notifiable since 2006

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical illness in an infant less than 1 month of age with laboratory confirmation of infection:

- isolation of group B *Streptococcus* (*Streptococcus agalactiae*) from a normally sterile site (such as blood or cerebrospinal fluid)

OR

- demonstration of group B *Streptococcus* DNA in a normally sterile site

#### 3.2 Probable case

Clinical illness in an infant less than 1 month of age with laboratory confirmation of infection:

- detection of group B *Streptococcus* antigen in a normally sterile site

### 4.0 Laboratory Comments

Isolates should be forwarded to the National Microbiology Laboratory reference centre for further characterization.

### 5.0 Clinical Evidence

There are two forms of clinical illness: early onset disease (1-7 days), characterized by sepsis,

respiratory distress, apnea, shock, pneumonia and meningitis; and late onset disease (7 days to 1 month), characterized by bacteremia, meningitis and other focal infections.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

A 40.1; B 95.1

#### 6.2 ICD-9 Code(s)

041.02

### 7.0 Type of International Reporting

### 8.0 Comments

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### 9.0 References

*Case definitions for diseases under national surveillance.* CCDR 2000;26(S3):55.

Lachenauer CS, Wessels MR. Group B Streptococcus. In: Behrman RE, Kliegman RM, Jenson HB (eds.). *Nelson Textbook of Paediatrics*. 17<sup>th</sup> ed. Philadelphia: W.B. Saunders, 2004;879-83.

## **Group B Streptococcal Disease of the Newborn**

Nationally notifiable since 2006

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Zangwill KM, Schuchat A, Wenger JD. *Group B Streptococcal disease in the United States, 1990: report from a multistate active surveillance system*. In: CDC Surveillance Summaries (November 20). MMWR 1992;41(No. SS-6):25-32.

Centers for Disease Control and Prevention. *Prevention of perinatal group B streptococcal disease*. MMWR 2002;51(No. RR-11):1-18.

Money DM, Boucher M, Crane J et al. SOGC Clinical Practice Guidelines. *The prevention of early onset neonatal Group B streptococcal disease*. J Obstet Gynecol Can 2004;26(9):826-32.

Schrag SJ, Zywicki S, Farley MM et al. *Group B streptococcal disease in the era of intrapartum antibiotic prophylaxis*. N Engl J Med 2000;342:15-20.

**Date of Last Revision/Review:** May 2008

## **Diseases Preventable by Routine Vaccination**

- Acute Flaccid Paralysis (AFP)
- Poliomyelitis
- Varicella (Chickenpox)
- Diphtheria
- *Haemophilus influenzae* Serotype b, Invasive Disease
- *Haemophilus influenzae* non-b, Invasive Disease
- Hepatitis B
- Measles
- Mumps
- Pertussis
- Rubella
- Congenital Rubella Syndrome (CRS)
- Tetanus

## Acute Flaccid Paralysis

Nationally notifiable since 1996

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### 1.0 National Notification

Only *clinical cases* should be notified.

### 2.0 Type of Surveillance

Syndromic surveillance involving the following:

1. Enhanced, active case-by-case notification by the Canadian Paediatric Surveillance Program (CPSP).
2. Enhanced, active case-by-case notification by paediatric tertiary care hospitals involved in the Immunization Monitoring Program, Active (IMPACT).

### 3.0 Case Classification

#### 3.1 Clinical case

Acute onset of focal weakness or paralysis characterized as flaccid (reduced tone) without other obvious cause (e.g. trauma) in children < 15 years old, including Guillain Barré syndrome (GBS). Transient weakness (e.g. post-ictal weakness) should not be reported.

Note: Other conditions present symptoms similar to paralytic poliomyelitis. A record is kept of all definitive diagnoses for all reported cases of AFP meeting the clinical case definition. GBS is the most common cause of AFP in childhood, but other differential diagnoses include, but are not limited to, transverse myelitis, peripheral neuropathy, enteroviruses, acute non-bacterial meningitis, brain abscess, China Syndrome and post-polio sequelae. Poliomyelitis must be

distinguished from other paralytic conditions by isolation of polio virus from stool.

### 4.0 Laboratory Comments

### 5.0 Clinical Evidence

### 6.0 ICD Code(s)

There are no specific ICD codes for acute flaccid paralysis as it is the clinical presentation of a set of symptoms and not the final diagnosis.

### 7.0 Type of International Reporting

Polio is targeted for eradication. As such, it requires highly sensitive surveillance for AFP, including immediate case investigation and specimen collection. The case definitions implemented by Canada's Working Group on Polio Eradication are standardized case definitions recommended by the WHO.

Other conditions present symptoms similar to paralytic poliomyelitis. Documenting polio-specific investigations, regardless of suspected diagnosis, is the means by which Canada maintains its polio-free certification. In addition, global surveillance indicators for certification include the detection of at least one AFP case in every 100,000 children under 15 years of age. Canadian data are reported regularly to the WHO.

## **Acute Flaccid Paralysis**

Nationally notifiable since 1996

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### **8.0 Comments**

The Canadian clinical case definition is more specific than the WHO definition. The WHO's Technical Advisory Group on Polio Eradication has adopted a probable case definition as being any case of acute flaccid paralysis in a person under 15 years of age for any reason other than severe trauma, or paralytic illness in a person of any age in whom polio is suspected.

### **9.0 References**

Pan American Health Organization. Norms and standards in epidemiology: guidelines for epidemiological surveillance (malaria, poliomyelitis). *Epidemiol Bull* 1999;20(2):11 3.

Pan American Health Organization. *Poliomyelitis Eradication Field Guide*. 3<sup>rd</sup> edition. 2006. Retrieved May 2008, from [www.paho.org/english/ad/fch/im/fieldguide\\_polio.pdf](http://www.paho.org/english/ad/fch/im/fieldguide_polio.pdf)

The Global Polio Eradication Initiative. Retrieved May 2008, from <http://www.polioeradication.org/>

### **10.0 Previous Case Definitions**

*Case definitions for diseases under national surveillance*. *CCDR* 2000;26(S3).

**Date of Last Revision/Review:** May 2008

## **Poliomyelitis**

Nationally notifiable since 1924

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### **1.0 National Notification**

Only *confirmed cases* of disease should be notified.

Immediate notification to the Public Health Agency of Canada is required in the event that any jurisdiction is investigating a probable case of poliomyelitis.

### **2.0 Type of Surveillance**

Routine case-by-case notification to the federal level.

### **3.0 Case Classification**

#### **3.1 Confirmed case (see also section 3.4, Confirmed case categories)**

Clinical illness (see section 5.0) with laboratory confirmation of infection:

- isolation of polio virus (vaccine or wild-type) from an appropriate clinical specimen

OR

- detection of polio virus RNA

OR

Clinical illness in a person who is epidemiologically linked to a laboratory-confirmed case

#### **3.2 Probable case**

Clinical illness without detection of polio virus from an appropriate clinical specimen and without evidence of infection with other neurotropic viruses but with one of the following laboratory confirmations of infection:

- significant rise (e.g. fourfold or greater) in polio IgG titre by any standard serologic assay between acute and convalescent sera

OR

- positive serologic test for polio IgM antibody in the absence of recent immunization with polio virus-containing vaccine

### **3.3 Suspected case**

Clinical illness and no laboratory confirmation of infection (no polio virus detection or serologic evidence), including negative test results and inadequate or no investigation

### **3.4 Confirmed case categories**

Confirmed cases of poliomyelitis can be further subdivided into the following two categories:

#### **1) Wild virus**

Laboratory investigation implicates wild-type virus. This group is further subdivided as follows:

- Imported: travel in or residence in a polio-endemic area 30 days or less before onset of symptoms
- Import-related: epidemiologic link to someone who has travelled in or resided in a polio-endemic area within 30 days of onset of symptoms
- Indigenous: no travel or contact as described above

#### **2) Vaccine-associated virus**

Laboratory investigation implicates vaccine-type virus. This group is further subdivided as follows:

- Recipient: the illness began 7-30 days after the patient received oral polio vaccine (OPV)

## Poliomyelitis

Nationally notifiable since 1924

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- Contact: the patient was shown to have been in contact with an OPV-recipient and became ill 7-60 days after the contact was vaccinated
- Possible contact: the patient had no known direct contact with an OPV-recipient and no history of receiving OPV, but the paralysis occurred in an area in which a mass vaccination campaign using OPV had been in progress 7-60 days before the onset of paralysis
- No known contact: the patient had no known contact with an OPV-recipient and no history of receiving OPV, and the paralysis occurred in an area where no routine or intensive OPV vaccination had been in progress. In Canada, this would include all provinces and territories.

### 4.0 Laboratory Comments

### 5.0 Clinical Evidence

Clinical illness is characterized by all of the following:

- acute flaccid paralysis of one or more limbs
- decreased or absent deep tendon reflexes in the affected limbs
- no sensory or cognitive loss
- no other apparent cause (including laboratory investigation to rule out other causes of a similar syndrome) neurologic deficit present 60 days after onset of initial symptoms, unless the patient has died

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

A80 Acute poliomyelitis

#### 6.2 ICD-9/ICD-9CM Code(s)

045 Acute poliomyelitis

### 7.0 Type of International Reporting

Notification of any case of poliomyelitis due to wild-type poliovirus is required under the *International Health Regulations* (2005).

### 8.0 Comments

Detection and investigation of all acute flaccid paralysis (AFP) cases is necessary to rule out poliovirus infection. AFP surveillance is used to monitor Canada's polio-free status (refer to section on Acute Flaccid Paralysis).

There is a global goal to eradicate polio. Elimination of indigenous wild poliovirus transmission was certified in Canada, and the rest of the American region, in September 1994. However, until global eradication of poliomyelitis is achieved, there is an ongoing risk for importation of wild polioviruses. The WHO and global polio eradication initiative partners maintain information on countries currently affected by outbreaks and/or importations of polio (see The Global Polio Eradication Initiative. <http://www.polioeradication.org/>).



## **Poliomyelitis**

Nationally notifiable since 1924

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### **9.0 References**

1. *Activities leading to polio elimination. In: Canadian National Report on Immunization, 1996.* CCDR1997;23(S4).
2. Pan American Health Organization. *Poliomyelitis Eradication Field Guide.* 3<sup>rd</sup> edition. Scientific and Technical Publication No. 607. 2006. Retrieved May 2008, from [www.paho.org/english/ad/fch/im/fieldguide\\_polio.pdf](http://www.paho.org/english/ad/fch/im/fieldguide_polio.pdf)
3. The Global Polio Eradication Initiative. Retrieved May 2008, from <http://www.polioeradication.org/>

### **10.0 Previous Case Definitions**

*Canadian Communicable Disease Surveillance System: disease-specific case definitions and surveillance methods.* Can Dis Wkly Rep 1991;17(S3).

*Case definitions for diseases under national surveillance.* CCDR 2000;26(S3).

**Date of Last Revision/Review:** May 2008

## Varicella (Chickenpox)

Nationally notifiable since 1924-1959, 1986 onwards

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

Enhanced active case-by-case notification by paediatric tertiary care hospitals involved in the Immunization Monitoring Program, Active (IMPACT)

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical evidence of illness and laboratory confirmation of infection:

- isolation or direct antigen detection of varicella-zoster virus (VZV) from an appropriate clinical specimen

OR

- detection of VZV DNA

OR

- seroconversion or a significant rise (e.g. fourfold or greater) by any standard serologic assay in varicella-zoster IgG titre between acute and convalescent sera

OR

- positive serologic test for varicella-zoster IgM antibody

OR

Clinical evidence of illness in a person with an epidemiologic link to a laboratory-confirmed case of chickenpox or VZV infection

#### 3.2 Probable case

Clinical evidence of illness in the absence of laboratory confirmation or epidemiologic link to a laboratory confirmed case

### 4.0 Laboratory Comments

Vaccine and wild-type VZV strains can be differentiated by PCR-based protocol available at the National Microbiology Laboratory.

### 5.0 Clinical Evidence

Clinical illness is characterized by a rash with rapid evolution of macules to papules, vesicles and crusts; all stages are simultaneously present; lesions are superficial and may appear in crops.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

B01 Varicella

#### 6.2 ICD-9/ICD-9CM Code(s)

052 Chickenpox

### 7.0 Type of International Reporting

### 8.0 Comments

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

## **Varicella (Chickenpox)**

Nationally notifiable since 1924-1959, 1986 onwards

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### **9.0 References**

National Microbiology Laboratory Guide to Services. VZV: *Strain differentiation of extracted DNA samples using real-time PCR methodology*. 2008. Retrieved May 2008, from <http://www.nml-lnm.gc.ca/english/guide/guideview.asp?key=15>

### **10.0 Previous Case Definitions**

*Canadian Communicable Disease Surveillance System: disease-specific case definitions and surveillance methods*. Can Dis Wkly Rep 1991;17(S3).

*Case definitions for diseases under national surveillance*. CCDR 2000;26(S3).

**Date of Last Revision/Review:** May 2008

## Diphtheria

Nationally notifiable since 1924

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### 1.0 National Reporting

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical illness (see section 5.0) or systemic manifestations compatible with diphtheria in a person with an upper respiratory tract infection or infection at another site (e.g. wound, cutaneous) PLUS at least one of the following:

- Laboratory confirmation of infection:
  - o isolation of *Corynebacterium diphtheriae* with confirmation of toxin from an appropriate clinical specimen, including the exudative membrane
- OR
- o isolation of other toxigenic *Corynebacterium* species (*C. ulcerans* or *C. pseudotuberculosis*) from an appropriate clinical specimen, including the exudative membrane
- OR
- o histopathologic diagnosis of diphtheria
- OR
- Epidemiologic link (contact within two weeks prior to onset of symptoms) to a laboratory-confirmed case

#### 3.2 Probable case

Clinical illness in the absence of laboratory confirmation or epidemiologic link to a laboratory-confirmed case

#### 3.3 Suspect case

Upper respiratory tract infection (nasopharyngitis, laryngitis or tonsillitis) with or without a nasal, tonsillar, pharyngeal and/or laryngeal membrane

### 4.0 Laboratory Comments

Isolation of *Corynebacterium* species capable of producing diphtheria toxin (*C. diphtheriae*, *C. ulcerans* or *C. pseudotuberculosis*) should be tested using the modified ELEK assay OR assay for the presence of the diphtheria tox gene, which, if detected, should be tested for expression of diphtheria toxin using the modified ELEK assay

### 5.0 Clinical Evidence

Clinical illness is characterized as an upper respiratory tract infection (nasopharyngitis, laryngitis or tonsillitis) with or without an adherent nasal, tonsillar, pharyngeal and/or laryngeal membrane, plus at least one of the following:

- gradually increasing stridor
- cardiac (myocarditis) and/or neurologic involvement (motor and/or sensory palsies) one to six weeks after onset
- death, with no known cause

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

A36 Diphtheria

#### 6.2 ICD-9/ICD-9CM Code(s)

032 Diphtheria

## Diphtheria

Nationally notifiable since 1924

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### 7.0 Type of International Reporting –

N/A

*diphtheriae* in Vancouver's urban poor. J Clin Microbiol 2006;44:1625-9.

### 8.0 Comments

Suspect and probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

Although rare, other toxigenic *Corynebacterium* species (*C. ulcerans* or *C. pseudotuberculosis*) may cause clinical diphtheria. Cases with clinically compatible illness and isolation of other toxigenic *Corynebacterium* species are nationally notifiable.

Significant, systemic disease is occasionally caused by non-toxigenic strains of these species in specific patient populations.

### 10.0 Previous Case Definitions

*Canadian Communicable Disease Surveillance System: disease-specific case definitions and surveillance methods*. Can Dis Wkly Rep 1991;17(S3).

*Case definitions for diseases under national surveillance*. CCDR 2000;26(S3).

**Date of Last Revision/Review:** May 2008

### 9.0 References

1. Laboratory Centre for Disease Control. *Guidelines for the control of diphtheria in Canada*. CCDR 1998;24(S3).
2. De Winter LM, Bernard KA, Romney MG. *Human clinical isolates of Corynebacterium diphtheriae and Corynebacterium ulcerans which do not meet the criteria for notifiable diphtheria in Canada 1999-2003*. J Clin Microbiol 2005;43:3447-9.
3. Romney MG, Roscoe DL, Bernard K, Lai S, Efstratiou A, Clarke AM. *Emergence of an invasive clone of non-toxigenic Corynebacterium*

## ***Haemophilus influenzae* Serotype b, Invasive Disease**

Nationally notifiable since 1979

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### **1.0 National Notification**

Only confirmed cases of disease should be notified.

- Buccal cellulitis or epiglottitis in a child < 5 years of age with no other causative organisms isolated

### **2.0 Type of Surveillance**

Routine case-by-case notification to the federal level

Enhanced case-by-case notification to International Circumpolar Surveillance in participating Northern regions

Enhanced, active case-by-case notification by paediatric tertiary care hospitals involved in the Immunization Monitoring Program, Active (IMPACT)

### **3.0 Case Classification**

#### **3.1 Confirmed case**

Clinical evidence of invasive disease (see section 5.0) with laboratory confirmation of infection:

- isolation of *H. influenzae* (serotype b) (Hib) from a normally sterile site

OR

- isolation of *H. influenzae* (serotype b) from the epiglottis in a person with epiglottitis

#### **3.2 Probable case**

Clinical evidence of invasive disease with laboratory evidence of infection:

- demonstration of *H. influenzae* type b antigen in cerebrospinal fluid

OR

- demonstration of *H. influenzae* DNA in a normally sterile site

OR

### **4.0 Laboratory Comments**

Detection of *H. influenzae* DNA is considered probable, not confirmed, because Hib may be present in a non-pathogenic role and thus, depending on the site, may NOT reflect the actual pathogen. Additionally, detection of *H. influenzae* DNA in a sterile site does NOT indicate that it is type b, since this test does not differentiate between serotypes.

### **5.0 Clinical Evidence**

Clinical illness associated with invasive disease due to *H. influenzae* includes meningitis, bacteraemia, epiglottitis, pneumonia, pericarditis, septic arthritis and empyema.

### **6.0 ICD Code(s)**

Note: ICD codes do not differentiate between b and non-b serotypes

#### **6.1 ICD-10 Code(s)**

A41.3 Septicaemia due to *Haemophilus influenzae*

A49.2 *H. influenzae* infection, unspecified site

B96.3 *H. influenzae* as cause of disease classified elsewhere

G00.0 Meningitis due to *Haemophilus influenzae*

J05.1 Acute epiglottitis

J14 Pneumonia due to *Haemophilus influenzae*

## ***Haemophilus influenzae* Serotype b, Invasive Disease**

Nationally notifiable since 1979

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P23.6 Congenital pneumonia due to  
*Haemophilus influenzae*

### **6.2 ICD-9/ICD-9CM Code(s)**

038.41 Septicaemia due to *Haemophilus influenzae*

041.5 *H. influenzae* infection of unspecified site and in conditions classified elsewhere

320.0 Meningitis due to *Haemophilus influenzae*

464.3 Acute epiglottitis

482.2 Pneumonia due to *Haemophilus influenzae*

### **9.0 References**

### **10.0 Previous Case Definitions**

*Canadian Communicable Disease Surveillance System: disease-specific case definitions and surveillance methods.* Can Dis Wkly Rep 1991;17(S3).

*Case definitions for diseases under national surveillance.* CCDR 2000;26(S3).

**Date of Last Revision/Review:** May 2008

### **7.0 Type of International Reporting**

### **8.0 Comments**

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

Between 1979 and 1985, only *H. influenzae* type b (Hib) meningitis was nationally notifiable. Beginning in 1986, all invasive forms of *H. influenzae* type b disease were nationally notifiable. Current vaccination programs only provide protection against Hib.

Although rare, increasingly non-b serotypes of *H. influenzae* have been found to cause invasive disease in Canada. Cases with clinically compatible illness and isolation of non-b serotypes of *H. influenzae* are also nationally notifiable (see *Haemophilus influenzae* non-b, Invasive Disease).

## ***Haemophilus influenzae* non-b, Invasive Disease**

Nationally notifiable since 2007

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### **1.0 National Notification**

Only *confirmed cases* of disease\* should be notified.

### **2.0 Type of Surveillance**

Routine case-by-case notification to the federal level

Enhanced case-by-case notification to International Circumpolar Surveillance in participating Northern regions

Enhanced, active case-by-case notification by paediatric tertiary care hospitals involved in the Immunization Monitoring Program, Active (IMPACT)

### **3.0 Case Classification**

#### **3.1 Confirmed case**

Clinical evidence of invasive disease (see section 5.0) with laboratory confirmation of infection:

- isolation of *H. influenzae* (serotypes a, c, d, e, f, undifferentiated and non-typeable isolates) from a normally sterile site

OR

- isolation of *H. influenzae* (serotypes a, c, d, e, f, undifferentiated and non-typeable isolates) from the epiglottis in a person with epiglottitis

### **4.0 Laboratory Comments**

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\* *Haemophilus influenzae* non-b invasive disease includes serotypes a, c, d, e, f, undifferentiated and non-typeable isolates.

### **5.0 Clinical Evidence**

Clinical illness associated with invasive disease due to *H. influenzae* includes meningitis, bacteremia, epiglottitis, pneumonia, pericarditis, septic arthritis and empyema.

### **6.0 ICD Code(s)**

Note: ICD codes do not differentiate between b and non-b serotypes

#### **6.1 ICD-10 Code(s)**

- A41.3 Septicaemia due to *Haemophilus influenzae*
- A49.2 *H. influenzae* infection, unspecified site
- B96.3 *H. influenzae* as cause of disease classified elsewhere
- G00.0 Meningitis due to *Haemophilus influenzae*
- J05.1 Acute epiglottitis
- J14 Pneumonia due to *Haemophilus influenzae*
- P23.6 Congenital pneumonia due to *Haemophilus influenzae*

#### **6.2 ICD-9/ICD-9CM Code(s)**

- 038.41 Septicaemia due to *Haemophilus influenzae*
- 041.5 *H. influenzae* infection of unspecified site and in conditions classified elsewhere
- 320.0 Meningitis due to *Haemophilus influenzae*
- 464.3 Acute epiglottitis
- 482.2 Pneumonia due to *Haemophilus influenzae*



## ***Haemophilus influenzae* non-b, Invasive Disease**

Nationally notifiable since 2007

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### **7.0 Type of International Reporting**

### **8.0 Comments**

See *Haemophilus influenzae* serotype b, Invasive Disease.

### **9.0 References**

**Date of Last Revision/Review:** May 2008

## Hepatitis B

Nationally notifiable since 1969

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### 1.0 National Notification

The following cases of disease should be notified:

- Confirmed acute
- Although it is recognized that chronic hepatitis B infections are not reportable in all provinces and territories, where possible, chronic and unspecified infections should be notified to the national level.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Acute case

##### 3.1.1 Confirmed case

- Hepatitis B surface antigen (HBsAg) and immunoglobulin M antibody to hepatitis B core antigen (anti-HBcIgM) positive in the context of a compatible clinical history or probable exposure

OR

- Clearance of HBsAg in a person who was documented to be HBsAg positive within the last six months in the context of a compatible clinical history or probable exposure

##### 3.1.2 Probable case

Acute clinical illness in a person who is epidemiologically linked to a confirmed case

### 3.2 Chronic carrier

#### 3.2.1 Confirmed case

- HBsAg positive for more than 6 months
- OR
- Detection of HBsAg in the documented absence of anti-HBc-IgM
- OR
- Detection of HBV DNA for more than 6 months

### 3.3 Unspecified

#### 3.3.1 Confirmed case

- Does not fit the criteria for either 3.1 or 3.2 above

AND

- HBsAg positive
- OR
- Detection of HBV DNA

### 4.0 Laboratory Comments

Occult HBV infection is characterized by a positive HBV DNA and presence of anti-HBc alone or anti-HBc and anti-HBs in the absence of HBsAg.

Further isolate characterization is indicated for epidemiologic public health and control purposes.

### 5.0 Clinical Evidence

Acute clinical illness is characterized by a discrete onset of symptoms and jaundice or elevated serum aminotransferase levels. Chronic infections may present with disease flares with similar symptoms and signs.

## Hepatitis B

Nationally notifiable since 1969

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### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

- B16 Acute hepatitis B
- B16.0 Acute hepatitis B with delta-agent (coinfection) with hepatic coma
- B16.1 Acute hepatitis B with delta-agent (coinfection) without hepatic coma
- B16.2 Acute hepatitis B without delta-agent with hepatic coma
- B16.9 Acute hepatitis B without delta-agent and without hepatic coma
- Hepatitis B (acute)(viral) NOS
- B18.0, Chronic viral hepatitis B with delta-agent
- B18.1 Chronic viral hepatitis B without delta-agent

#### 6.2 ICD-9 Code(s)

- 070.30 Hepatitis B (acute)
- 070.20 Hepatitis B (acute) with hepatic coma
- 070.21/31 Hepatitis B (acute) with hepatitis delta
- V02.61 Hepatitis B (carrier status)
- 070.32 Hepatitis B (chronic )
- 070.22 Hepatitis B (chronic ) with hepatic coma
- 070.23 Hepatitis B (chronic ) with hepatitis delta

### 7.0 Type of International Reporting

None

### 8.0 Comments

### 9.0 References

*Case definitions for diseases under national surveillance.* CCDR 2000;26(S3). Retrieved May 2008, from <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/00vol26/26s3/index.html>

**Date of Last Revision/Review:** May 2008

## Measles

Nationally notifiable since 1924

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Active, weekly case-by-case notification (including zero-notification) by provincial and territorial ministries of health to the Canadian Measles/Rubella Surveillance System (CMRSS).

### 3.0 Case Classification

#### 3.1 Confirmed case

Laboratory confirmation of infection in the absence of recent immunization (see section 5.0) with measles-containing vaccine:

- isolation of measles virus from an appropriate clinical specimen
- OR
- detection of measles virus RNA
- OR
- seroconversion or a significant (e.g. fourfold or greater) rise in measles IgG titre by any standard serologic assay between acute and convalescent sera
- OR
- positive serologic test for measles IgM antibody using a recommended assay (see section 4.0) in a person who is either epidemiologically linked to a laboratory-confirmed case or has recently travelled to an area of known measles activity
- OR
- Clinical illness (see section 5.0) in a person with an epidemiologic link to a laboratory-confirmed case

#### 3.2 Probable case

Clinical illness

- in the absence of appropriate laboratory tests
- OR
- in the absence of an epidemiologic link to a laboratory-confirmed case
- OR
- in a person who has recently travelled to an area of known measles activity

### 4.0 Laboratory Comments

IgM serology has the potential for false-positive findings. If the clinical presentation is inconsistent with a diagnosis of measles or in the absence of recent travel/exposure history, IgM results must be confirmed by the other listed confirmatory methods.

Most acute measles cases develop IgM after 3 days post rash onset. Therefore, a suspected measles case in which serum collected  $\leq 3$  days after rash onset initially tests IgM negative should have a second serum specimen collected  $> 3$  days after onset for retesting for IgM.

Further strain characterization is indicated for epidemiologic, public health and control purposes.

### 5.0 Clinical Evidence

The most frequent reaction to measles-mumps-rubella (MMR) immunization is malaise and fever (with or without rash) occurring 7-12 days after immunization. However, this should be determined for each case, as these reactions and the time frame can vary (*Canadian Immunization Guide*, 7<sup>th</sup> edition).

## Measles

Nationally notifiable since 1924

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Clinical illness is characterized by all of the following features:

- fever of 38.3° C or greater
- cough, coryza or conjunctivitis
- generalized maculopapular rash for at least 3 days

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

B05 Measles

#### 6.2 ICD-9/ICD-9CM Code(s)

055 Measles

### 7.0 Type of International Reporting

Weekly reporting of confirmed cases to the Pan American Health Organization, in accordance with the 1994 goal of measles elimination from the Western Hemisphere.

### 8.0 Comments

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

The case definitions for measles provided in this document are for routine surveillance purposes. Readers are referred to the document *Measles surveillance: guidelines for laboratory support* for further information on laboratory issues and the role of laboratories and public health in sporadic cases and outbreaks (<http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/98vol24/dr2405ea.html>).

Active weekly surveillance began in 1998. All cases are reviewed by the Immunization and Respiratory Infections Division (Public Health Agency of Canada) for classification before being added to the national database.

### 9.0 References

*Measles surveillance: guidelines for laboratory support*. CCDR 1999;25(24).

Pan American Health Organization. *Measles Elimination Field Guide*. 2<sup>nd</sup> edition. Scientific and Technical Publication No. 605. Retrieved May 2008, from [http://www.paho.org/english/ad/fch/im/fieldguide\\_measles.pdf](http://www.paho.org/english/ad/fch/im/fieldguide_measles.pdf)

### 10.0 Previous Case Definitions

*Canadian Communicable Disease Surveillance System: disease-specific case definitions and surveillance methods*. Can Dis Wkly Rep 1991;17(S3).

*Case definitions for diseases under national surveillance*. CCDR 2000;26(S3).

**Date of Last Revision/Review: May 2008**

## Mumps

Nationally notifiable since 1924-1959, 1986 onwards

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

OR

- in the absence of an epidemiologic link to a laboratory-confirmed case.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level.

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical illness (see section 5.0) and laboratory confirmation of infection in the absence of recent immunization (see section 5.0) with mumps-containing vaccine:

- isolation of mumps virus from an appropriate clinical specimen

OR

- detection of mumps virus RNA

OR

- seroconversion or a significant rise (e.g. fourfold or greater) in mumps IgG titre by any standard serologic assay between acute and convalescent sera

OR

- positive serologic test for mumps IgM antibody (see section 4.0) in a person who is either epidemiologically linked to a laboratory-confirmed case or has recently travelled to an area of known mumps activity

OR

Clinical illness in a person with an epidemiologic link to a laboratory-confirmed case

#### 3.2 Probable case

Clinical illness

- in the absence of appropriate laboratory tests

### 4.0 Laboratory Comments

IgM serology has the potential for false-positive findings. If the clinical presentation is inconsistent with a diagnosis of mumps or in the absence of recent travel/exposure history, IgM results must be confirmed by the other listed confirmatory methods.

Further strain characterization is indicated for epidemiologic, public health and control purposes.

### 5.0 Clinical Evidence

Clinical illness is characterized by acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland, lasting > 2 days, and without other apparent cause.

The most frequent reaction to measles-mumps-rubella (MMR) immunization is malaise and fever (with or without rash) occurring 7-12 days after immunization. Parotitis has occasionally occurred after immunization. However, this should be determined for each case, as these reactions and the time frame can vary (*Canadian Immunization Guide*, 7<sup>th</sup> edition).

A laboratory-confirmed case may not exhibit clinical illness, as up to 30% of cases are asymptomatic.

## Mumps

Nationally notifiable since 1924-1959, 1986 onwards

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### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

B26 Mumps

#### 6.2 ICD-9/ICD-9CM Code(s)

072 Mumps

### 7.0 Type of International Reporting

N/A

### 8.0 Comments

The case definitions for mumps provided in this document are for routine surveillance purposes. Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes. Readers are referred to the document *Laboratory Guidelines for the Diagnosis of Mumps (2007)* for further information on the collection, transport, laboratory testing and laboratory test interpretation of specimens suspected of mumps. (<http://www.phac-aspc.gc.ca/mumps-oreillons/prof-eng.php#labtest>)

### 9.0 References

Public Health Agency of Canada. *Laboratory Guidelines for the Diagnosis of Mumps*. 2007. Retrieved May 2008, from [http://www.nml-lnm.gc.ca/guide/docs/Mumps\\_Lab\\_\\_guide.pdf](http://www.nml-lnm.gc.ca/guide/docs/Mumps_Lab__guide.pdf)

### 10.0 Previous Case Definitions

*Canadian Communicable Disease Surveillance System: disease-specific case definitions and surveillance methods*. Can Dis Wkly Rep 1991;17(S3).

*Case definitions for diseases under national surveillance*. CDR 2000;26(S3).

**Date of Last Revision/Review:** May 2008

## **Pertussis**

Nationally notifiable since 1924

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### **1.0 National Notification**

Only *confirmed cases* of disease should be notified.

### **2.0 Type of Surveillance**

Routine case-by-case notification to the federal level

Enhanced, active case-by-case notification by paediatric tertiary care hospitals involved in the Immunization Monitoring Program, Active (IMPACT)

### **3.0 Case Classification**

#### **3.1 Confirmed case**

Laboratory confirmation of infection:

- isolation of *Bordetella pertussis* from an appropriate clinical specimen

OR

- detection of *B. pertussis* DNA from an appropriate clinical specimen **AND** one or more of the following:

- o cough lasting 2 weeks or longer
- o paroxysmal cough of any duration
- o cough with inspiratory “whoop”
- o cough ending in vomiting or gagging, or associated with apnea

OR

Epidemiologic link to a laboratory-confirmed case **AND** one or more of the following for which there is no other known cause:

- o paroxysmal cough of any duration
- o cough with inspiratory “whoop”
- o cough ending in vomiting or gagging, or associated with apnea

#### **3.2 Probable case**

Cough lasting 2 weeks or longer in the absence of appropriate laboratory tests and not epidemiologically linked to a laboratory-confirmed case **AND** one or more of the following, with no other known cause:

- paroxysmal cough of any duration
- cough with inspiratory “whoop”
- cough ending in vomiting or gagging, or associated with apnea

#### **3.3 Suspect case**

One or more of the following, with no other known cause:

- paroxysmal cough of any duration
- cough with inspiratory “whoop”
- cough ending in vomiting or gagging, or associated with apnea

### **4.0 Laboratory Comments**

### **5.0 Clinical Evidence**

### **6.0 ICD Code(s)**

#### **6.1 ICD-10 Code(s)**

A37 Whooping cough (pertussis)

#### **6.2 ICD-9/ICD-9CM Code(s)**

033 Whooping cough (pertussis)

### **7.0 Type of International Reporting**

N/A



## **Pertussis**

Nationally notifiable since 1924

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### **8.0 Comments**

Probable and suspect case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

Laboratory test results should be interpreted in the context of the clinical presentation of the patient.

Detection of *B. pertussis* by culture has a limited/low sensitivity and high specificity. This may result in under-reporting of cases.

### **9.0 References**

*Health Canada. National Consensus Conference on Pertussis. CCDR 2003;29(S3):1-39.*

*Public Health Agency of Canada. Proceedings of the National Microbiology Laboratory Pertussis Workshop. CCDR 2006;32(S4):1-22.*

### **10.0 Previous Case Definitions**

*Canadian Communicable Disease Surveillance System: disease-specific case definitions and surveillance methods. Can Dis Wkly Rep 1991;17(S3).*

*Case definitions for diseases under national surveillance. CCDR 2000;26(S3).*

**Date of Last Revision/Review:** May 2008

## Rubella

Nationally notifiable since 1924

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### 1.0 National Reporting

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Active, weekly case-by-case notification (including zero-notification) by provincial and territorial ministries of health to the Canadian Measles/Rubella Surveillance System (CMRSS)

### 3.0 Case Classification

#### 3.1 Confirmed case

Laboratory confirmation of infection in the absence of recent immunization (see section 5.0) with rubella containing vaccine:

- isolation of rubella virus from an appropriate clinical specimen
- OR
- detection of rubella virus RNA
- OR
- seroconversion or a significant (e.g. fourfold or greater) rise in rubella IgG titre by any standard serologic assay between acute and convalescent sera
- OR
- positive serologic test for rubella IgM antibody using a recommended assay (see section 4.0) in a person with an epidemiologic link to a laboratory-confirmed case or who has recently travelled to an area of known rubella activity
- OR
- Clinical illness (see section 5.0) in a person with an epidemiologic link to a laboratory-confirmed case

#### 3.2 Probable case

Clinical illness

- in the absence of appropriate laboratory tests
- OR
- in the absence of an epidemiologic link to a laboratory-confirmed case
- OR
- in a person who has recently travelled to an area of known rubella activity

### 4.0 Laboratory Comments

- IgM serology has the potential for false-positive findings. If the clinical presentation is inconsistent with a diagnosis of rubella or in the absence of recent travel/exposure history, IgM results must be confirmed by the other listed confirmatory methods. Rubella avidity serology is recommended for IgM positive results in pregnant women.
- Most acute rubella cases develop IgM after 5 days post rash onset. Therefore, a suspected rubella case in which serum collected < 5 days after rash onset initially tests IgM negative should have a second serum collected > 5 days after onset for retesting for IgM.
- Further strain characterization is indicated for epidemiologic, public health and control purposes.

### 5.0 Clinical Evidence

Clinical illness is characterized by fever and rash, and at least one of the following:

- arthralgia/arthritis
- lymphadenopathy
- conjunctivitis

## Rubella

Nationally notifiable since 1924

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The most frequent reaction to measles-mumps-rubella (MMR) immunization is malaise and fever (with or without rash) occurring 7-12 days after immunization. However, this should be determined for each case, as these reactions and time frames can vary (*Canadian Immunization Guide*, 7<sup>th</sup> edition).

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

B06 Rubella

#### 6.2 ICD-9/ICD-9CM Code(s)

056 Rubella

### 7.0 Type of International Reporting

Weekly reporting to the Pan American Health Organization, in accordance with the goal of eliminating rubella and congenital rubella syndrome in the Western Hemisphere.

### 8.0 Comments

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

Active weekly surveillance began in 2006. All cases are reviewed by the Immunization and Respiratory Infections Division (Public Health Agency of Canada) for classification before being added to the national database.

### 9.0 References

1. Pan American Health Organization. *Measles Elimination Field Guide*. 2<sup>nd</sup> edition. Scientific and Technical Publication No. 605. Retrieved May 2008, from [www.paho.org/english/ad/fch/im/fieldguide\\_measles.pdf](http://www.paho.org/english/ad/fch/im/fieldguide_measles.pdf)

2. Pan American Health Organization. *Elimination of Rubella and Congenital Rubella Syndrome Field Guide*. Scientific and Technical Publication No. 606.

### 10.0 Previous Case Definitions

*Canadian Communicable Disease Surveillance System: disease-specific case definitions and surveillance methods*. Can Dis Wkly Rep 1991;17(S3).

*Case definitions for diseases under national surveillance*. CCDDR 2000;26(S3).

**Date of Last Revision/Review: May 2008**

## Congenital Rubella Syndrome/Infection

Nationally notifiable since 1979

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### 1.0 National Reporting

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Active, weekly case-by-case notification (including zero-notification) by provincial and territorial ministries of health to the Canadian Measles/Rubella Surveillance System (CMRSS)

Routine case-by-case notification to the federal level.

### 3.0 Case Classification

*Congenital Rubella Syndrome (CRS)*

#### 3.1 Confirmed case

*Live birth:* two clinically compatible manifestations (any combination from Table 1, Columns A and B) with laboratory confirmation of infection:

- isolation of rubella virus from an appropriate clinical specimen
- OR
- detection of rubella virus RNA
- OR
- positive serologic test for IgM antibody in the absence of recent immunization with rubella-containing vaccine
- OR
- rubella IgG persisting for longer than would be expected (approximately six months after birth) from passive transfer of maternal antibody, or in the absence of recent immunization

*Still birth:* two clinically compatible

manifestations with isolation of rubella virus from an appropriate clinical specimen

#### 3.2 Probable case

In the absence of appropriate laboratory tests, a case that has at least

- any two clinically compatible manifestations listed in Table 1, column A
- OR
- one manifestation listed in Table 1, column A, plus one listed in Table 1, column B

NOTE: The following *cannot* be classified as a case of CRS:

- rubella antibody titre absent in the infant
- OR
- rubella antibody titre absent in the mother
- OR
- rubella antibody titre declining in the infant consistent with the normal decline after birth of passively transferred maternal antibody

*Congenital Rubella Infection*

#### Confirmed case

Laboratory confirmation of infection but with no clinically compatible manifestations:

- isolation of rubella virus from an appropriate clinical specimen
- OR
- detection of rubella virus RNA
- OR
- positive serologic test for rubella IgM antibody in the absence of recent immunization with rubella-containing vaccine
- OR
- rubella IgG persisting for longer than would be expected (approximately six

## Congenital Rubella Syndrome/Infection

Nationally notifiable since 1979

months after birth) from passive transfer of maternal antibody, or in the absence of recent immunization

**Table 1. Congenital Rubella Syndrome: Clinically Compatible Manifestations**

Column A	Column B
1. Cataracts or congenital glaucoma (either one or both count as one)	1. Purpura
2. Congenital heart defect	2. Hepatosplenomegaly
3. Sensorineural hearing loss	3. Microcephaly
4. Pigmentary retinopathy	4. Micro ophthalmia
	5. Mental retardation
	6. Meningoencephalitis
	7. Radiolucent bone disease
	8. Developmental or late onset conditions such as diabetes and progressive panencephalitis and any other conditions possibly caused by rubella virus

### 4.0 Laboratory Comments

Further strain characterization is indicated for epidemiologic, public health and control purposes.

### 5.0 Clinical Evidence

See Table 1

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

B06.0 plus G05.1, B06.9  
P35.0 Congenital rubella

#### 6.2 ICD-9/ICD-9CM Code(s)

056.01 Encephalomyelitis due to rubella  
771.0 Congenital rubella

### 7.0 Type of International Reporting

Weekly reporting to the Pan American Health Organization, in accordance with the goal of eliminating rubella and congenital rubella syndrome in the Western Hemisphere.

### 8.0 Comments

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

Active weekly surveillance began in 2006. All cases are reviewed by the Immunization and Respiratory Infections Division (Public Health Agency of Canada) for classification before being added to the national database.

### 9.0 References

Pan American Health Organization. *Elimination of Rubella and Congenital Rubella Syndrome Field Guide*. Scientific and Technical Publication No. 606.

## **Congenital Rubella Syndrome/Infection**

Nationally notifiable since 1979

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### **10.0 Previous Case Definitions**

*Canadian Communicable Disease Surveillance System: disease-specific case definitions and surveillance methods. Can Dis Wkly Rep 1991;17(S3).*

*Case definitions for diseases under national surveillance. CCDR 2000;26(S3).*

**Date of Last Revision/Review:** May 2008

## Tetanus

Nationally notifiable since 1957

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed Case

Clinical evidence of illness (see section 5.0) without other apparent medical cause with or without isolation of *Clostridium tetani* and with or without history of injury

### 4.0 Laboratory Comments

### 5.0 Clinical Evidence

Clinical illness is characterized by acute onset of hypertonia and/or painful muscular contractions (usually of the muscles of the jaw and neck), and generalized muscle spasms without other apparent medical cause.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

A35 Tetanus

#### 6.2 ICD-9/ICD-9CM Code(s)

037 Tetanus

### 7.0 Type of International Reporting

### 8.0 Comments

Detection of *C. tetani* toxin should not be considered among the list of laboratory methods for confirmation of tetanus since this assay is not available or in use.

### 9.0 References

#### 10.0 Previous Case Definitions

*Canadian Communicable Disease Surveillance System: disease-specific case definitions and surveillance methods*. Can Dis Wkly Rep 1991;17(S3).

*Case definitions for diseases under national surveillance*. CDR 2000;26(S3).

Retrieved May 2008, from <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/00vol26/26s3/index.html>

**Date of Last Revision/Review:** May 2008

## **Sexually Transmitted and Bloodborne Pathogens**

- Acquired Immunodeficiency Syndrome
- Human Immunodeficiency Virus (HIV) Infection
- Chlamydia (*Chlamydia trachomatis* Infection)
- Gonorrhea
- Hepatitis C
- Syphilis, All Categories



## Acquired Immunodeficiency Syndrome (AIDS)

Nationally notifiable since 1982

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

- one or more of the specified indicator diseases (see section 5.0)
- AND
- meeting the case definition of HIV infection

### 4.0 Laboratory Comments

See case definition of HIV infection.

### 5.0 Clinical Evidence

#### Indicator diseases for adult and pediatric cases:

- Bacterial pneumonia (recurrent)\*
- Candidiasis (bronchi, trachea or lungs)
- Candidiasis (esophageal)\*
- Cervical cancer (invasive)
- Coccidioidomycosis (disseminated or extrapulmonary)
- Cryptococcosis (extrapulmonary)
- Cryptosporidiosis chronic intestinal (> 1 month duration)
- Cytomegalovirus diseases (other than in liver, spleen or nodes)
- Cytomegalovirus retinitis (with loss of vision)\*
- Encephalopathy, HIV-related (dementia)

- *Herpes simplex*: chronic ulcer(s) (> 1 month duration) or bronchitis, pneumonitis or esophagitis
- Histoplasmosis (disseminated or extrapulmonary)
- Isosporiasis, chronic intestinal (> 1 month duration)
- Kaposi's sarcoma\*
- Lymphoma, Burkitt's (or equivalent term)
- Lymphoma, immunoblastic (or equivalent term)
- Lymphoma (primary in brain)
- *Mycobacterium avium* complex or *M. kansasii* (disseminated or extrapulmonary)\*
- *Mycobacterium* of other species or unidentified species\*
- *M. tuberculosis* (disseminated or extrapulmonary)
- *M. tuberculosis* (pulmonary)\*
- *Pneumocystis jirovecii* (formerly *Pneumocystis carinii*) pneumonia (PCP)\*
- Progressive multifocal leukoencephalopathy
- *Salmonella* septicemia (recurrent)
- Toxoplasmosis of brain\*
- Wasting syndrome due to HIV

#### Indicator diseases that apply only to pediatric cases (< 15 years old):

- Bacterial infections (multiple or recurrent, excluding recurrent bacterial pneumonia)
- Lymphoid interstitial pneumonia and/or pulmonary lymphoid hyperplasia\*

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

B20-B24

#### 6.2 ICD-9 Code(s)

042-044

## **Acquired Immunodeficiency Syndrome (AIDS)**

Nationally notifiable since 1982

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### **7.0 Type of International Reporting**

Informal sharing of data on a regular basis with the WHO, Pan American Health Organization and Joint United Nations Programme on HIV/AIDS

### **8.0 Comments**

### **9.0 References**

*Case definitions for diseases under national surveillance*. *CCDR* 2000;26(S3). Retrieved May 2008, from <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/00vol26/26s3/index.html>

**Date of Last Revision/Review:** May 2008

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\* These conditions may be diagnosed presumptively; otherwise, definitive diagnosis is required. Criteria for presumptive and definitive diagnoses are provided on the back of the HIV/AIDS case report form.

## Human Immunodeficiency Virus (HIV)

Nationally notifiable since 1995

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

##### Adults, Adolescents and Children $\geq$ 18 months:

- detection of HIV antibody with confirmation (e.g. EIA screening with confirmation by Western blot or other confirmatory test)
- OR
- detection of HIV nucleic acid (e.g. DNA PCR or plasma RNA)
- OR
- HIV p24 antigen with confirmation by neutralization assay
- OR
- isolation of HIV in culture

##### Children < 18 months (on two separate samples collected at different times):

- detection of HIV nucleic acid (e.g. DNA PCR or plasma RNA)
- OR
- HIV p24 antigen with confirmation by neutralization assay
- OR
- isolation of HIV in culture

### 4.0 Laboratory Comments

In children < 18 months of age born to HIV-positive women, nucleic acid testing should be done within two weeks after birth and, if negative, repeated at 1 to 2 months and at 3 to 4 months of age. Any positive results should be repeated with a second specimen for confirmation.

For children who are born to HIV-positive women and who have negative nucleic acid results, antibody testing should be done at 12 and 18 months of age to ensure that they have lost maternally derived antibodies. (This is not used to determine uninfected status but rather to eliminate the possibility of a positive antibody result being misinterpreted.) These children should continue to be monitored until they have a negative HIV antibody test.

### 5.0 Clinical Evidence

#### 6.0 ICD Code(s)

##### 6.1 ICD-10 Code(s)

B20-B24

##### 6.2 ICD-9 Code(s)

042-044

### 7.0 Type of International Reporting

Informal sharing of data on a regular basis with WHO, Pan American Health Organization and Joint United Nations Programs on HIV/AIDS

### 8.0 Comments

## **Human Immunodeficiency Virus (HIV)**

Nationally notifiable since 1995

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### **9.0 References**

*Case definitions for diseases under national surveillance.* CCDR 2000;26(S3).  
Retrieved May 2008, from <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/00vol26/26s3/index.html>

**Date of Last Revision/Review:** May 2008

## Chlamydia (*Chlamydia trachomatis* Infection)

Nationally notifiable since 1990

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case—Genital Infections

Laboratory evidence of infection in genitourinary specimens:

- detection of *C. trachomatis* by culture
- OR
- detection of *C. trachomatis* nucleic acid
- OR
- detection of *C. trachomatis* antigen

#### 3.2 Confirmed Case—Extra-genital infections

Laboratory evidence of infection in rectum, conjunctiva, pharynx and other extra-genital sites:

- detection of *C. trachomatis* by culture
- OR
- detection of *C. trachomatis* nucleic acid
- OR
- detection of *C. trachomatis* antigen

#### 3.3 Confirmed Case—Perinatally Acquired Infections

Laboratory evidence of infection:

- Detection and confirmation of *C. trachomatis* in nasopharyngeal or other respiratory tract specimens from an infant in whom pneumonia developed in the first six months of life:

- isolation of *C. trachomatis* by culture
- OR
- demonstration of *C. trachomatis* nucleic acid
- OR
- demonstration of *C. trachomatis* antigen
- OR
- Detection and confirmation of *C. trachomatis* in conjunctival specimens from an infant who developed conjunctivitis in the first month of life:
- isolation of *C. trachomatis* by culture
- OR
- demonstration of *C. trachomatis* nucleic acid
- OR
- demonstration of *C. trachomatis* antigen

### 4.0 Laboratory Comments

IgM antibody detection is suitable for diagnosis of *C. trachomatis* pneumonia in infants < 3 months of age only.

### 5.0 Clinical Evidence

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

- A56
- Not specified

#### 6.2 ICD-9 Code(s)

- 099.5, 099.41, 099.50, 099.52, 099.53, 099.54, 099.55
- Not specified

## **Chlamydia (*Chlamydia trachomatis* Infection)**

Nationally notifiable since 1990

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### **7.0 Type of International Reporting**

None

### **8.0 Comments**

Each case classification is mutually exclusive.

Individuals with more than one site of infection concurrently may fall under more than one case classification but will be counted as one case with multiple sites of infection identified to avoid duplicate counting of cases.

For information on reporting cases of Lymphogranuloma venereum (LGV) through the national LGV Enhanced Surveillance System, please refer to the Public Health Agency of Canada Web site: [http://www.phac-aspc.gc.ca/publicat/lgv/lgv-rdt\\_e.html](http://www.phac-aspc.gc.ca/publicat/lgv/lgv-rdt_e.html).

### **9.0 References**

*Case definitions for diseases under national surveillance*. CCDR 2000;26(S3). Retrieved May 2008, from <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/00vol26/26s3/index.html>

**Date of Last Revision/Review:** May 2008

## Gonorrhoea

Nationally notifiable since 1924

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case—Genital Infections

Laboratory confirmation of infection in genitourinary specimens:

- detection of *Neisseria gonorrhoeae* by culture
- OR
- detection of *N. gonorrhoeae* nucleic acid

#### 3.2 Confirmed Case—Extra-genital infections

Laboratory confirmation of infection from pharynx, rectum, joint, conjunctiva, blood and other extra-genital sites:

- detection of *N. gonorrhoeae* by culture
- OR
- detection of *N. gonorrhoeae* nucleic acid

#### 3.3 Confirmed Case—Perinatally Acquired Infections

Laboratory confirmation of infection from a neonate in the first four weeks of life leading to the diagnosis of gonococcal conjunctivitis, scalp abscess, vaginitis, bacteremia, arthritis, meningitis or endocarditis:

- detection of *N. gonorrhoeae* by culture
- OR
- detection of *N. gonorrhoeae* nucleic acid

### 4.0 Laboratory Comments

Further strain characterization is indicated for epidemiologic, public health and control purposes.

A positive test for Gram-negative intracellular diplococci in symptomatic males with urethral discharge provides a presumptive diagnosis for gonorrhoea in men.

### 5.0 Clinical Evidence

#### 6.0 ICD Code(s)

##### 6.1 ICD-10 Code(s)

A54.0, A54.1, A54.2, A54.5, A54.6 , A54.9

##### 6.2 ICD-9 Code(s)

098.11, 098.15, 098.16, 098.31, 098.35, 098.14, 098.34, 098.0, 098.2

### 7.0 Type of International Reporting

### 8.0 Comments

Each case classification is mutually exclusive.

Individuals with more than one site of infection concurrently may fall under more than one case classification but will be counted as one case with multiple sites of infection identified, to avoid duplicate counting of cases.

## **Gonorrhoea**

Nationally notifiable since 1924

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### **9.0 References**

*Case definitions for diseases under national surveillance.* CCDR 2000;26(S3).  
Retrieved May 2008, from <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/00vol26/26s3/index.html>

**Date of Last Revision/Review:** May 2008



## Hepatitis C

Nationally notifiable since 1999

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed Case That Does Not Distinguish Acute from Chronic Infection

Detection of anti-hepatitis C antibodies (anti-HCV) (positive anti-HCV tests should be confirmed by a second manufacturer's EIA, immunoblot or NAT for HCV RNA).

OR

Detection of hepatitis C virus RNA

### 4.0 Laboratory Comments

Anti-HCV testing should not be performed in infants < 18 months of age as the anti-HCV may represent passive maternal antibody. As most infections occur at the time of childbirth, if testing for HCV RNA is considered, it should be delayed beyond 4 to 12 weeks to avoid false-negative HCV RNA test results. Cord blood should not be used because of potential cross-contamination with maternal antibody.

The HCV serologic window period is approximately 5-10 weeks, and it is estimated that 30% of acute infections may be missed if anti-HCV is the only marker of infection used during this period. HCV-RNA is detectable within two to three

weeks of infection and, in the context of clinical illness, can identify acute HCV infection even in the absence of anti-HCV.

If HCV-RNA is used solely to confirm active infection, a repeat test is recommended.

Confirmation of acute infection requires a documented seroconversion, i.e. in a previously anti-HCV seronegative individual.

Approximately 25% (range 15% to 45%) of HCV infections will resolve spontaneously. These individuals will typically demonstrate anti-HCV without detectable HCV RNA (using a test with a lower limit of detection of 10-50 IU/mL)

Immunocompromised individuals may not develop anti-HCV (e.g. HIV infection with CD4 counts < 50). These individuals may need to undergo HCV RNA testing.

Positive anti-HCV tests should be confirmed by a second manufacturer's EIA, immunoblot or NAT for HCV RNA.

### 5.0 Clinical Evidence

Acute clinical illness is characterized by a discrete onset of symptoms and jaundice or elevated serum aminotransferase levels. Chronic infections may present with disease flares with similar symptoms and signs.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

B17.1, B18.2

## **Hepatitis C**

Nationally notifiable since 1999

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### **6.2 ICD-9 Code(s)**

070.70, 070.71, 070.41, 070.44, 070.51,  
070.54

### **7.0 Type of International Reporting**

None

### **8.0 Comments**

### **9.0 References**

*Case definitions for diseases under national surveillance.* CCDR 2000;26(S3).  
Retrieved May 2008, from <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/00vol26/26s3/index.html>

**Date of Last Revision/Review:** September 2008

# Syphilis

Nationally notifiable since 1924

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## 1.0 National Notification

Only *confirmed cases* of disease should be notified.

## 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

## 3.0 Case Classification

### 3.1 Confirmed case—Early Congenital Syphilis (within 2 years of birth)

Laboratory confirmation of infection:

- identification of *Treponema pallidum* by dark-field microscopy, fluorescent antibody or equivalent examination of material from nasal discharges, skin lesions, placenta, umbilical cord or autopsy material of a neonate (up to four weeks of age)

OR

- reactive serology (non-treponemal and treponemal) from venous blood (not cord blood) in an infant/child with clinical, laboratory or radiographic evidence of congenital syphilis\* whose mother is without documented evidence of adequate treatment

OR

- detection of *T. pallidum* DNA in an appropriate clinical specimen

### 3.2 Confirmed Case—Primary Syphilis

Laboratory confirmation of infection:

- identification of *T. pallidum* by dark-field microscopy, fluorescent antibody, nucleic acid testing, or equivalent examination of material from a chancre or a regional lymph node

OR

- presence of one or more typical lesions (chancres) and reactive treponemal serology, regardless of non-treponemal test reactivity, in individuals with no previous history of syphilis

OR

- presence of one or more typical lesions (chancres) and a fourfold or greater increase in the titre over the last known non-treponemal test in individuals with a past history of syphilis treatment

### 3.3 Confirmed Case—Secondary Syphilis

Laboratory evidence of infection:

- identification of *T. pallidum* by dark-field microscopy, fluorescent antibody, nucleic acid testing or equivalent examination of mucocutaneous lesions, condylomata lata and reactive serology (non-treponemal and treponemal)

OR

- presence of typical signs or symptoms of secondary syphilis (e.g. mucocutaneous lesions, alopecia, loss of eyelashes and lateral third of eyebrows, iritis, generalized lymphadenopathy, fever, malaise or splenomegaly) AND either a reactive serology (non-treponemal and treponemal) OR a fourfold or greater increase in titre over the previous known non-treponemal test

### 3.4 Confirmed Case—Early Latent Syphilis (< 1 year after infection)

Laboratory confirmation of infection:

- an asymptomatic patient with reactive

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\* Includes any evidence of congenital syphilis on physical examination (e.g. hepatosplenomegaly), evidence of congenital syphilis on radiographs of long bones, a reactive CSF VDRL, an elevated CSF cell count or protein without other cause

## Syphilis

Nationally notifiable since 1924

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serology (treponemal and/or non-treponemal) who, within the previous 12 months, had one of the following:

- non-reactive serology
- symptoms suggestive of primary or secondary syphilis
- exposure to a sexual partner with primary, secondary or early latent syphilis

### 3.5 Confirmed Case—Late Latent Syphilis (> 1 year after infection or of unknown duration)

Laboratory confirmation of infection:

- an asymptomatic patient with persistently reactive treponemal serology (regardless of non-treponemal serology reactivity) who does not meet the criteria for early latent disease and who has not been previously treated for syphilis

### 3.6 Confirmed Case—Neurosyphilis

#### 3.6.1 Infectious (< 1 year after infection)

Laboratory confirmation of infection:

- Fits the criteria in 3.2, 3.3 OR 3.4 above AND one of the following:
- reactive CSF-VDRL in non-bloody cerebrospinal fluid (CSF)
- clinical evidence of neurosyphilis AND either elevated CSF leukocytes OR elevated CSF protein in the absence of other known causes

#### 3.6.2 Non-infectious (> 1 year after infection)

Laboratory confirmation of infection:

- reactive treponemal serology (regardless of non-treponemal serology reactivity) AND one of the following:
- reactive CSF-VDRL in non-bloody CSF

- clinical evidence of neurosyphilis AND either elevated CSF leukocytes OR elevated CSF protein in the absence of other known causes

### 3.7 Confirmed Case—Tertiary Syphilis Other than Neurosyphilis

Laboratory confirmation of infection:

- reactive treponemal serology (regardless of non-treponemal test reactivity) together with characteristic late abnormalities of the cardiovascular system, bone, skin or other structures, in the absence of other known causes of these abnormalities (*T. pallidum* is rarely seen in these lesions although, when present, it is diagnostic)

AND

- no clinical or laboratory evidence of neurosyphilis

### 4.0 Laboratory Comments

Diagnosis of syphilis requires a combination of history, including epidemiologic risk factors or exposure, physical examination and laboratory tests, as there is no single optimum diagnostic criterion.

Dark-field microscopy testing for *T. pallidum* is not reliable for oral/rectal lesions, as non-pathogenic treponemes may be present. Instead, direct fluorescent antibody test for *T. pallidum* should be used on such specimens.

### 5.0 Clinical Evidence

## **Syphilis**

Nationally notifiable since 1924

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### **6.0 ICD Code(s)**

#### **6.1 ICD-10 Code(s)**

A50.0, A50.1, A51, A52

#### **6.2 ICD-9 Code(s)**

097.9, 097.1, 096, 092, 095, 091, 093, 094

### **7.0 Type of International Reporting**

None

### **8.0 Comments**

Each category is mutually exclusive.

The possibility of a prozone reaction should be considered in individuals who are suspected of having secondary syphilis but whose non-treponemal test is non-reactive.

A prozone reaction refers to a false-negative response resulting from overwhelming antibody titres that interfere with the proper formation of the antigen-antibody lattice network that is necessary to visualize a positive flocculation test.

### **9.0 References**

*Case definitions for diseases under national surveillance*. *CCDR* 2000;26(S3). Retrieved May 2008, from <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/00vol26/26s3/index.html>

**Date of Last Revision/Review:** May 2008

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## **Vestorborne and Other Zoonotic Diseases**

- Anthrax
- Brucellosis
- Malaria
- Plague
- Rabies
- Tularemia
- West Nile Virus Infection
- Yellow Fever
- Lyme Disease

## **Anthrax**

Nationally notifiable since 2002

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### **1.0 National Notification**

Confirmed, probable and suspect cases of disease should be notified.

### **2.0 Type of Surveillance**

Routine case-by-case notification to the federal level

### **3.0 Case Classification**

#### **3.1 Confirmed case**

Clinical illness with laboratory confirmation of infection:

- Isolation of *Bacillus anthracis* in a clinical specimen

OR

- Demonstration of *B. anthracis* in a clinical specimen by immunofluorescence

#### **3.2 Probable case**

Suspected case with detection of *B. anthracis* DNA

#### **3.3 Suspect Case**

Clinical illness in a person who is epidemiologically linked to a confirmed or suspected animal case or contaminated animal product

### **4.0 Laboratory Comments**

### **5.0 Clinical Evidence**

**Cutaneous:** Clinical illness is characterized by the appearance of small, painless but often pruritic

papules. As the papule enlarges, it becomes vesicular and, within two days, ulcerates to form a distinctive black eschar, with surrounding edema.

**Inhalation:** Clinical illness is characterized by an upper-respiratory 'flu-like syndrome that, after a few days, takes a fulminant course, manifested by dyspnea, cough, chills and a high-grade bacteremia.

**Gastrointestinal:** Clinical illness is characterized by abdominal pain, fever and signs of septicaemia.

### **6.0 ICD Code(s)**

#### **6.1 ICD-10 Code(s) A 22**

#### **6.2 ICD 9 Code(s) 022**

### **7.0 Type of International Reporting**

### **8.0 Comments**

### **9.0 References**

Wilson RW, Sande MA. *Current Diagnosis and Treatment of Infectious Diseases*. McGraw-Hill Professional, 2001.

**Date of Last Revision/Review:** May 2008

## Brucellosis

Nationally notifiable since 1928

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical illness with laboratory confirmation of infection:

- Isolation of *Brucella* sp. from an appropriate clinical specimen

OR

- A significant (i.e., fourfold or greater) rise in *Brucella* agglutination titre between acute and convalescent serum specimens obtained 2 or more weeks apart and tested at the same laboratory

#### 3.2 Probable case

Clinical illness in a person who is epidemiologically linked to a confirmed animal case

OR

Clinical illness with supportive serology (*Brucella* agglutination test titre of 1:160 or higher in one or more serum specimens obtained after onset of symptoms)

### 4.0 Laboratory Comments

### 5.0 Clinical Evidence

Clinical illness characterized by acute or insidious onset of fever, night sweats, undue fatigue, anorexia, weight loss, headache and arthralgia.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

- A23 Brucellosis (includes fever: Malta, Mediterranean, undulant)
- A23.0 Brucellosis due to *Brucella melitensis*
- A23.1 Brucellosis due to *Brucella abortus*
- A23.2 Brucellosis due to *Brucella suis*
- A23.3 Brucellosis due to *Brucella canis*
- A23.8 Other brucellosis
- A23.9 Brucellosis, unspecified

#### 6.2 ICD 9 Code(s)

- 023 Brucellosis, (Includes fever: Malta, Mediterranean, undulant)
- 023.8 Other brucellosis, Infection by more than one organism
- 023.9 Brucellosis, unspecified

### 7.0 Type of International Reporting

### 8.0 Comments

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### 9.0 References

**Date of Last Revision/Review:** May 2008



## Malaria

Nationally notifiable since 1929-1978, 1983

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Laboratory confirmation of infection with or without clinical evidence of infection:

- demonstration of *Plasmodium* sp. in a blood smear/film (thick and thin)

#### 3.2 Probable case

Laboratory confirmation of infection with or without clinical evidence of infection:

- detection of *Plasmodium* sp. antigen in an appropriate clinical specimen

#### It should be noted that

- A case is counted if it is the individual's first attack of malaria in Canada, regardless of whether or not she/he has experienced previous attacks of malaria outside the country.
- A subsequent attack in the same person caused by a different *Plasmodium* species is counted as an additional case.
- A repeat attack by the same species is not counted as a new case unless the person has traveled to a malaria-endemic area since the previous attack.

### 4.0 Laboratory Comments

### 5.0 Clinical Evidence

Signs and symptoms vary; however, most patients experience fever. In addition to fever, common associated symptoms include headache, back pain, chills, sweats, myalgia, nausea, vomiting, diarrhea and cough. Severe untreated malaria can lead to coma, seizures, renal failure, pulmonary edema and death.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

B50, B51, B52, B53, B54

#### 6.2 ICD-9 Code(s)

084

### 7.0 Type of International Reporting

Elimination or eradication efforts should be reported.

### 8.0 Comments

Malaria cases are subdivided into the following categories:

- **Induced:** a confirmed case of malaria acquired through a blood transfusion from a donor in whom the parasite has been confirmed.
- **Autochthonous:** a confirmed case of malaria acquired by mosquito transmission within Canada.
- **Imported:** a confirmed case of malaria acquired outside Canada.
- **Congenital, confirmed:** a confirmed case of malaria in an infant < 3 months old who has not left Canada since birth, with confirmation of the presence of the parasite in the mother.

## Malaria

Nationally notifiable since 1929-1978, 1983

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- **Congenital, probable:** a confirmed case of malaria in an infant < 3 months old who has not left Canada since birth, but without demonstration of the presence of the parasite in the mother.

It should be noted that the WHO requires different case classification. In areas with access to laboratory-based diagnosis, the WHO classifies malaria case as asymptomatic malaria, confirmed uncomplicated malaria, confirmed severe malaria and confirmed malaria death.

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### 9.0 References

*Case definitions for diseases under national surveillance.* CCDR 2000;26(S3). Retrieved May 2008, from <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/00vol26/26s3/index.html>

Centers for Disease Control and Prevention. *Case definitions for infectious conditions under public health surveillance.* MMWR 1997;46(No. RR-10):22-3.

World Health Organization. Department of Communicable Disease Surveillance and Response (October 1999). *WHO Recommended Surveillance Standards.* 2<sup>nd</sup> ed. WHO/CDS/CSR/ISR/99.2. Retrieved May 29, 2007, from [www.who.int/csr/resources/publications/surveillance/whocdscsr992.pdf](http://www.who.int/csr/resources/publications/surveillance/whocdscsr992.pdf)

**Date of Last Revision/Review:** May 2008

## Plague

Nationally notifiable since 1988

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical evidence of illness with laboratory confirmation of infection:

- isolation of *Yersinia pestis* from body fluids

OR

- a significant (i.e. fourfold or greater) rise in serum antibody titre to *Y. pestis* fraction 1 (F1) antigen by EIA or passive hemagglutination/inhibition titre

#### 3.2 Probable case

Clinical evidence of illness with any of the following laboratory evidence:

- demonstration of elevated serum antibody titre(s) to *Y. pestis* F1 antigen (without documented significant [i.e. fourfold or greater] change) in a patient with no history of plague immunization

OR

- demonstration of *Y. pestis* F1 antigen by immunofluorescence

OR

- detection of *Y. pestis* nucleic acid

OR

- > 1:10 passive hemagglutination/inhibition titre in a single serum sample in a patient with no history of vaccination or previous infection

OR

- detection of *Y. pestis* antibody by EIA

### 4.0 Laboratory Comments

Serologic confirmation is done by demonstration of a significant (i.e.. fourfold or greater) rise in serum antibody titre to *Y. pestis* F1 antigen by EIA or passive hemagglutination/inhibition titre.

### 5.0 Clinical Evidence

Plague is characterized by fever, chills, headache, malaise, prostration and leukocytosis, and is manifest in one or more of the following principal forms:

**Bubonic plague:** regional lymphadenitis

**Septicemic plague:** septicemia with or without an evident bubo

**Primary pneumonic plague:** inhalation of infectious droplets

**Secondary pneumonic plague:** pneumonia, resulting from hematogenous spread in bubonic or septicemic cases

**Pharyngeal plague:** pharyngitis and cervical lymphadenitis resulting from exposure to larger infectious droplets or ingestion of infected tissues

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

A20.2

#### 6.2 ICD-9 Code(s)

020.5

## Plague

Nationally notifiable since 1988

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### 7.0 Type of International Reporting

Mandatory reporting to the WHO if illness constitutes a public health emergency of international concern (PHEIC) as defined by the *International Health Regulations* (2005).

Elimination or eradication efforts should be reported.

Dennis DT, Gage KL, Gratz N et al. *Plague Manual*. Epidemiology, Distribution, Surveillance and Control. WHO/CDS/CSR/EDC/99.2. Geneva: World Health Organization, 1999.

Prentice MB, Rahalison L. *Plague*. *Lancet* 2007;369:1196-207.

**Date of Last Revision/Review: May 2008**

### 8.0 Comments

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### 9.0 References

Case definitions for diseases under national surveillance. *CCDR* 2000;26(S3). Retrieved May 2008, from <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/00vol26/26s3/index.html>

Centers for Disease Control and Prevention. *Case definitions for infectious conditions under public health surveillance*. *MMWR* 1997; 46 (No. RR-10):25-6.

World Health Organization. Department of Communicable Disease Surveillance and Response (October 1999). *WHO Recommended Surveillance Standards*. 2<sup>nd</sup> ed. WHO/CDS/CSR/ISR/99.2. Retrieved May 29, 2007, from [www.who.int/csr/resources/publications/surveillance/whocdscsr992.pdf](http://www.who.int/csr/resources/publications/surveillance/whocdscsr992.pdf)

## Rabies

Nationally notifiable since 1927

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical evidence of illness with laboratory confirmation of infection:

- detection of viral antigen in an appropriate clinical specimen, preferably the brain or the nerves surrounding hair follicles in the nape of the neck, by immunofluorescence

OR

- isolation of rabies virus from saliva, cerebrospinal fluid (CSF), or central nervous system tissue using cell culture or laboratory animal

OR

- detection of rabies virus RNA in an appropriate clinical specimen

#### 3.2 Probable case

Clinical evidence of illness with laboratory evidence:

- demonstration of rabies-neutralizing antibody titre  $\geq 5$  (complete neutralization) in the serum or CSF or an unvaccinated person

### 4.0 Laboratory Comments

Negative results do not rule out rabies infection because viral material may not be detectable (e.g. early in infection). CSF frequently remains negative.

The presence of rabies-neutralizing antibodies can indicate an exposure to rabies virus antigen or passive immunization.

Negative serologic results do not rule out a rabies infection because antibody levels may not surpass the detection threshold (0.5 IU) and seroconversion is usually very late.

### 5.0 Clinical Evidence

Rabies is an acute encephalomyelitis that almost always progresses to coma or death within 10 days after the first symptom.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

A82	Rabies
A82.0	Sylvatic rabies
A82.1	Urban rabies
A82.9	Rabies, unspecified

#### 6.2 ICD-9 Code(s)

### 7.0 Type of International Reporting

## **Rabies**

Nationally notifiable since 1927

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### **8.0 Comments**

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### **9.0 References**

**Date of Last Revision/Review:** May 2008

## Tularemia

Nationally notifiable since 2002

### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical illness (see section 5.0) with laboratory confirmation of infection:

- isolation of *Francisella tularensis* from an appropriate clinical specimen

OR

- a significant (e.g. fourfold or greater) change in serum antibody titre to *F. tularensis* antigen

#### 3.2 Probable case

Clinical illness with laboratory evidence:

- detection of *F. tularensis* in a clinical specimen by fluorescent assay

OR

- detection of *F. tularensis* nucleic acid

OR

- $\geq 1:128$  microagglutination titre or  $\geq 1:160$  tube agglutination in a single serum specimen

### 4.0 Laboratory Comments

### 5.0 Clinical Evidence

Clinical diagnosis is supported by evidence or history of a tick or deerfly bite, exposure to the

tissues of a mammalian host of *Francisella tularensis* or exposure to potentially contaminated water.

Clinical illness is characterized by several distinct forms:

**Ulceroglandular:** cutaneous ulcer with regional lymphadenopathy

**Glandular:** regional lymphadenopathy with no ulcer; oculoglandular conjunctivitis with preauricular lymphadenopathy; oropharyngeal stomatitis or pharyngitis; or tonsillitis and cervical lymphadenopathy

**Intestinal:** intestinal pain, vomiting, and diarrhea; pneumonic primary pleuropulmonary disease; typhoidal febrile illness without early localizing signs and symptoms

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

A21	Tularaemia (includes: deer-fly fever, infection due to <i>Francisella tularensis</i> , rabbit fever)
A21.0	Ulceroglandular tularaemia
A21.1	Oculoglandular tularaemia (Ophthalmic tularaemia)
A21.2	Pulmonary tularaemia
A21.3	Gastrointestinal tularaemia (Abdominal tularaemia)
A21.7	Generalized tularaemia
A21.8	Other forms of tularaemia
A21.9	Tularaemia, unspecified

#### 6.2 CD-7 Code(s)

### 7.0 Type of International Reporting

## **Tularemia**

Nationally notifiable since 2002

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### **8.0 Comments**

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### **9.0 References**

**Date of Last Revision/Review:** May 2008



## West Nile Virus

Nationally notifiable since June 2003

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### 1.0 National Reporting

*Probable* and *confirmed* cases of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### West Nile Virus Neurological Syndrome (WNNS)

##### 3.1 Confirmed case

Clinical criteria AND at least one of the confirmed case diagnostic test criteria

##### 3.2 Probable case

Clinical criteria AND at least one of the probable case diagnostic test criteria

##### 3.3 Suspect case

Clinical criteria in the absence of or pending diagnostic test criteria AND in the absence of any other obvious cause

#### Clinical Criteria

History of exposure in an area where West Nile virus (WNV) activity is occurring (see section 8.0)

OR

history of exposure to an alternative mode of transmission (see section 8.0)

AND

onset of fever

AND

recent onset of at least one of the following:

- encephalitis (acute signs of central or peripheral neurologic dysfunction)
- OR
- viral meningitis (pleocytosis and signs of infection, e.g. headache, nuchal rigidity)
- OR
- acute flaccid paralysis (e.g. poliomyelitis-like syndrome or Guillain-Barré-like syndrome)
- OR
- movement disorders (e.g. tremor, myoclonus)
- OR
- Parkinsonism or Parkinsonian-like conditions (e.g. cogwheel rigidity, bradykinesia, postural instability)
- OR
- other neurological syndromes

#### West Nile Virus Non-Neurological Syndrome (WN Non-NS)

##### 3.1 Confirmed case

Clinical criteria AND at least one of the confirmed case diagnostic test criteria

##### 3.2 Probable case

Clinical criteria AND at least one of the probable case diagnostic test criteria

##### 3.3 Suspect case

Clinical criteria in the absence of or pending diagnostic test criteria AND in the absence of any other obvious cause

#### Clinical Criteria

History of exposure in an area where WN virus (WNV) activity is occurring

OR

## West Nile Virus

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history of exposure to an alternative mode of transmission

AND

at least two of the following:

- fever
- myalgia
- anthralgia
- headache
- fatigue
- lymphadenopathy
- maculopapular rash

### West Nile Virus Asymptomatic Infection (WNAI)

#### 3.1 Confirmed case

Confirmed case diagnostic test criteria in the absence of clinical criteria

#### 3.2 Probable case

Probable case diagnostic test criteria in the absence of clinical criteria

### Confirmed Case Diagnostic Test Criteria

It is currently recommended that health jurisdictions/authorities use the Confirmed Case Diagnostic Test Criteria to confirm index cases (locally acquired) in their area each year; for subsequent cases, health jurisdictions/authorities could use the Probable Case Diagnostic Test Criteria to classify cases in their area as “confirmed”, **for the purposes of surveillance**. Throughout the remainder of the transmission season health jurisdictions/authorities may wish to document PRN antibody titres to West Nile virus in a proportion of cases, to be determined by that health jurisdiction/authority, in order to rule out the possibility of concurrent activity by

other flaviviruses. (For further information on diagnostic testing algorithms for West Nile virus, see the section entitled Laboratory Specimen Diagnostic Testing Algorithm in Appendix 4 of the National Guidelines for Response to West Nile virus.)

AT LEAST ONE of the following:

- a significant (e.g. fourfold or greater) change in WN virus neutralizing antibody titres (using a PRN or other kind of neutralization assay) in paired acute and convalescent sera, or CSF (see section 8.0 for testing of immunocompromised individuals)

OR

- isolation of WN virus from, or demonstration of WN virus-specific genomic sequences in, tissue, blood, CSF or other body fluids

OR

- demonstration of WN virus antigen in tissue

OR

- demonstration of flavivirus antibodies in a single serum or CSF sample using a WN virus IgM EIA (see section 8.0), confirmed by the detection of WN virus specific antibodies using a PRN (acute or convalescent specimen)

OR

- a significant (e.g. fourfold or greater) change in flavivirus haemagglutination inhibition (HI) titres in paired acute and convalescent sera or demonstration of a seroconversion using a WN virus IgG EIA AND the detection of WN specific antibodies using a PRN (acute or convalescent serum sample)

## West Nile Virus

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### Probable Case Diagnostic Test Criteria (see section 8.0 for comments)

AT LEAST ONE of the following:

- detection of flavivirus antibodies in a single serum or CSF sample using a WN virus IgM EIA without confirmatory neutralization serology (e.g. PRN)

OR

- a significant (e.g. fourfold or greater) change in flavivirus HI titres in paired acute and convalescent sera or demonstration of a seroconversion using a WN virus IgG EIA

OR

- a titre of > 1:320 in a single WN virus HI test or an elevated titre in a WN virus IgG EIA, with a confirmatory PRN result (Note: a confirmatory PRN or other kind of neutralization assay is not required in a health jurisdiction/authority where cases have already been confirmed in the current year.)

OR

- demonstration of Japanese encephalitis (JE) serocomplex-specific genomic sequences in blood by NAT screening on donor blood, by Blood Operators in Canada

### 4.0 Laboratory Comments

Sensitivity of NAT testing is approximately 50% when used on plasma/serum samples collected less than eight days after symptoms have been detected. Individuals infected with WN virus display a low level of viremia (on average several thousand genome copies) for approximately one week after symptom onset. The use of NAT testing on acute serum/plasma samples can complement IgM testing when used together to assay “early” acute specimens<sup>(1)</sup>.

### 5.0 Clinical Evidence

#### West Nile Neurological Syndrome (WNNS)

- A significant feature of West Nile viral neurologic illness may be marked muscle weakness that is more frequently unilateral but can be bilateral. WNV should be considered in the differential diagnosis of all suspected cases of acute flaccid paralysis with or without sensory deficit. WNV-associated weakness typically affects one or more limbs (sometimes affecting one limb only). Muscle weakness may be the sole presenting feature of WNV illness (in the absence of other neurologic features) or may develop in the setting of fever, altered reflexes, meningitis or encephalitis. Weakness typically develops early in the course of clinical infection. Patients should be carefully monitored for evolving weakness and in particular for acute neuromuscular respiratory failure, which is a severe manifestation associated with high morbidity and mortality. **For the purpose of WNV Neurologic Syndrome Classification, muscle weakness is characterized by severe (polio-like), non-transient and prolonged symptoms.** Electromyography (EMG) and lumbar puncture should be performed to differentiate WNV-associated paralysis from acute demyelinating polyneuropathy (e.g. Guillain-Barré syndrome). Lymphocytic pleocytosis (an increase in white blood cells with a predominance of lymphocytes in the CSF) is commonly seen in acute flaccid paralysis because of WNV, whereas pleocytosis is not a feature of Guillain-Barré syndrome. Other emerging clinical syndromes, identified during 2002, included, but were not limited to, the following: myelopathy, rhabdomyolysis (acute destruction

## West Nile Virus

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of skeletal muscle cells), peripheral neuropathy; polyradiculoneuropathy; optic neuritis; and acute demyelinating encephalomyelitis (ADEM). Ophthalmologic conditions, including chorioretinitis and vitritis, were also reported. As well, facial weakness was reported. Myocarditis, pancreatitis and fulminant hepatitis have not been identified in North America but were reported in outbreaks of WNV in South Africa. “Aseptic” meningitis without encephalitis or acute flaccid paralysis occurring in August and September when WNV is circulating may be due to non-polio enteroviruses circulating at the same time. This should be considered in the differential diagnosis<sup>(2-4)</sup>.

- A person with WNV-associated acute flaccid paralysis may present with or without fever or mental status changes. Altered mental status could range from confusion to coma with or without additional signs of brain dysfunction (e.g. paralysis, cranial nerve palsies, sensory deficits, abnormal reflexes, generalized convulsions and abnormal movements). Acute flaccid paralysis with respiratory failure is also a problem.

### West Nile Virus Non-Neurological Syndrome (WN Non-NS)

- It is possible that other clinical signs and symptoms could be identified that have not been listed and may accompany probable case or confirmed case diagnostic test criteria. For example, gastrointestinal symptoms were seen in many WNV patients in Canada and the USA in 2003 and 2004.
- Muscle weakness may be a presenting feature of WNV illness. For the purpose of WNV Non-

Neurological Syndrome classification, muscle weakness or myalgia (muscle aches and pains) is characterized by mild, transient, unlikely prolonged symptoms that are not associated with motor neuropathy.

### West Nile Virus Asymptomatic Infection (WNAI)

- This category could include asymptomatic blood donors whose blood is screened using a nucleic acid amplification test (NAT) by Blood Operators (i.e. Canadian Blood Services or Héma-Québec) and is subsequently brought to the attention of public health officials. The NAT that will be used by Blood Operators in Canada is designed to detect all viruses in the Japanese encephalitis (JE) serocomplex. The JE serocomplex includes WN virus and nine other viruses, although from this group only WN virus and St Louis encephalitis virus are currently endemic to parts of North America. Blood Operators in Canada perform a supplementary WN virus-specific NAT following any positive result from donor screening.

## 6.0 ICD Code(s)

### 6.1 ICD 10 CODE(S)

A92.3

### 6.2 ICD 9 CODE(S)

066.40, 066.41, 066.42, 066.49

## 7.0 Type of International Reporting

## West Nile Virus

Nationally notifiable since June 2003

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### 8.0 Comments

- History of exposure when and where West Nile virus transmission is present, or could be present, or history of travel to an area with confirmed WNV activity in birds, horses, other mammals, sentinel chickens, mosquitoes or humans.
- Alternative modes of transmission, identified to date, include laboratory acquired; in utero; receipt of blood components; organ/tissue transplant; and, possibly, through breast milk.
- Both CDC and commercial IgM/IgG EIAs are now available for front-line serologic testing. Refer to appropriate assay procedures and kit inserts for the interpretation of test results.
- Early in infection the immune system generates antibodies that bind relatively weakly to viral antigen (low avidity). As the infection proceeds, an increasing percentage of newly generated IgG antibody displays higher binding affinity to virus antigen and thus avidity also rises (note: avidity is usually measured according to the ability of IgG to dissociate from antigen preparations after incubation with a solution of urea). As long as high avidity IgG is not yet detected in the serum it can be assumed that the individual was exposed to the viral agent during a recent exposure. With respect to WNV infection it has not been precisely determined when (i.e. after exposure) high avidity antibodies reach levels in serum that can be accurately detected by serologic assays (there may be significant variation depending on the individual). However, it has been shown that greater than 95% of sera collected from individuals exposed to WNV six to eight months previously will have IgG antibodies that bind strongly to viral antigen and will give high avidity scores using both IFA and EIA testing formats. **Note: Avidity testing will not replace confirmatory neutralization testing; non-WNV flavivirus IgG antibody (e.g. dengue, St. Louis encephalitis) may bind to the antigen preparations used in avidity assays.**
- Note: WNV IgM antibody may persist for more than a year, and the demonstration of IgM antibodies in a patient's serum, particularly in residents of endemic areas, may not be diagnostic of an acute WN viral infection. Seroconversion (by HI, IgG EIA or PRN titre assays) demonstrates a current WNV infection. Therefore, the collection of acute and convalescent sera for serologic analysis is particularly important to rule out diagnostic misinterpretation early in the WNV season (e.g. May, June) and to identify initial cases in a specific jurisdiction. However, it should be noted that seroconversions may not always be documented because of the timing of acute sample collection (i.e. titres in acute sera may have already peaked). If static titres are observed in acute and convalescent paired sera, it is still possible the case may represent a recent infection. To help resolve this, the use of IgG avidity testing may be considered to distinguish between current and past infection. The presence of both IgM antibody and low avidity IgG in a patient's convalescent serum sample is consistent with current cases of viral-associated illness. However, test results that show the presence of IgM and high avidity IgG are indicative of exposures that have occurred in the previous season.
- Immunocompromised individuals may not be able to mount an immune response necessary for a serologic diagnosis. West Nile virus diagnostic

## West Nile Virus

Nationally notifiable since June 2003

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test criteria for these individuals should be discussed with a medical microbiologist.

### 9.0 References

1. Tilley P, Fox JD, Jayaraman GC, Preiksaitis JK. *Nucleic acid test for West Nile virus RNA in plasma enhances rapid diagnosis of acute infection in symptomatic patients.* J Infect Dis 2006;193:1361-1.
2. Sejvar J, Haddad MB, Tierney BC et al. *Neurologic manifestations and outcome of West Nile virus infection.* JAMA 2003;290:511-5.
3. Sejvar J, Bode AV, Marfin AA et al. *West Nile virus-associated flaccid paralysis.* Emerg Infect Dis 2003;9:788-93.
4. Burton JM, Kern RJ, Halliday W et al. *Neurological manifestations of West Nile virus infection.* Can J Neurol Sci 2004;31:185-93.

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## Yellow Fever

Nationally notifiable since 1988

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### 1.0 National Notification

Only *confirmed cases* of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical illness with laboratory confirmation of infection:

- isolation of yellow fever virus
- OR
- detection of yellow fever viral antigen in body fluids or tissue
- OR
- detection of yellow fever nucleic acid in body fluids or tissue
- OR
- a significant (i.e. fourfold or greater) rise in antibody titre to the yellow fever virus in the absence of yellow fever vaccination
- OR
- a single elevated yellow fever IgM antibody titre in the absence of yellow fever vaccination within the previous two months

#### 3.2 Probable case

Clinical illness with laboratory evidence of infection:

- a stable elevated antibody titre to yellow fever virus with no other known cause
- cross-reactive serologic reactions to other flaviviruses must be excluded, and the patient must not have a history of yellow fever vaccination

### 4.0 Laboratory Comments

### 5.0 Clinical Evidence

Yellow fever is a mosquito-borne viral illness characterized by acute onset of fever and constitutional symptoms followed by a brief remission and a recurrence of fever, hepatitis, albuminuria and, in some instances, renal failure, shock and generalized hemorrhages.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

- A95
- A95.0 Sylvatic yellow fever (Jungle yellow fever)
- A95.1 Urban yellow fever
- A95.9 Yellow fever, unspecified

#### 6.2 ICD-9 Code(s)

- 060

### 7.0 Type of International Reporting

### 8.0 Comments

Probable case definitions are provided as guidelines to assist with case finding and public health management, and are not for national notification purposes.

### 9.0 References

**Date of Last Revision/Review:** May 2008

## Lyme Disease

Nationally notifiable since 2009

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### 1.0 National Notification

*Confirmed* and *probable* cases of disease should be notified.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Clinical evidence of illness with laboratory confirmation:

- isolation of *Borrelia burgdorferi* from an appropriate clinical specimen

OR

- detection of *B. burgdorferi* DNA by PCR

OR

Clinical evidence of illness with a history of residence in, or visit to, an endemic area and with laboratory evidence of infection:

- positive serologic test using the two-tier ELISA and Western Blot criteria (see section 4.0)

#### 3.2 Probable case

Clinical evidence of illness without a history of residence in, or visit to, an endemic area\* and with laboratory evidence of infection:

- positive serologic test using the two-tier ELISA and Western Blot criteria (see section 4.0)

OR

Clinician-observed erythema migrans without laboratory evidence but with history of residence in, or visit to, an endemic area\*

### 4.0 Laboratory Comments

Criteria for serologic testing are described by the guidelines of the Canadian Public Health Laboratory Network<sup>(1)</sup>. Serologic evidence is confirmatory only in patients with erythema migrans or objective clinical evidence of disseminated Lyme disease, and a history of residence in, or visit to, an endemic area.

### 5.0 Clinical Evidence

The clinical information presented below is not intended to describe the complete range of signs and symptoms that may be used in a clinical diagnosis of Lyme disease. Symptoms of early or late disseminated Lyme disease are described in the 2006 clinical practice guidelines of the Infectious Diseases Society of America<sup>(2)</sup>. Other symptoms that are, or have been suggested to be, associated with Lyme disease (including those of so-called “chronic” Lyme disease and post Lyme disease syndromes) are considered too non-specific to define cases for surveillance purposes, whether or not they may be caused by *B. burgdorferi* infection.

The following signs and symptoms constitute objective clinical evidence of illness for surveillance purposes for Lyme disease:

**Erythema migrans:** a round or oval expanding erythematous area of the skin greater than 5 cm in diameter and enlarging slowly over a period of several days to weeks. It appears one to two weeks (range 3-30 days) after infection and

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\* An endemic area is defined as a locality in which a reproducing population of *Ixodes scapularis* or *I. pacificus* tick vectors is known to exist, as demonstrated by molecular methods, to support transmission of *B. burgdorferi* at that site



## Lyme Disease

Nationally notifiable since 2009

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persists for up to eight weeks. Some lesions are homogeneously erythematous, whereas others have prominent central clearing or a distinctive target-like appearance. On the lower extremities, the lesion may be partially purpuric. Signs of acute or chronic inflammation are not prominent. There is usually little pain, itching, swelling, scaling, exudation or crusting, erosion or ulceration, except that some inflammation associated with the tick bite itself may be present at the very centre of the lesion. Note: An erythematous skin lesion present while a tick vector is still attached or that has developed within 48 hours of detachment is most likely a tick bite hypersensitivity reaction (i.e. a non-infectious process), rather than erythema migrans. Tick bite hypersensitivity reactions are usually < 5 cm in largest diameter, sometimes have an urticarial appearance and typically begin to disappear within 24-48 hours.

OR

**Objective evidence of disseminated Lyme disease includes any of the following when an alternative explanation is not found:**

- **Neurological** – Early neurological Lyme disease: acute peripheral nervous system involvement, including radiculopathy, cranial neuropathy and mononeuropathy multiplex (multifocal involvement of anatomically unrelated nerves), and CNS involvement, including lymphocytic meningitis and, rarely, encephalomyelitis (parenchymal inflammation of brain and/or spinal cord with focal abnormalities). Late neurologic Lyme disease may present as encephalomyelitis, peripheral neuropathy or encephalopathy.

- **Musculoskeletal** – Lyme arthritis is a monoarticular or oligoarticular form of arthritis most commonly involving the knee, but other large joints or the temporomandibular joint may be involved. Large effusions that are out of proportion to the pain are typical. Lyme arthritis is often intermittent if untreated, with episodes of joint inflammation spontaneously resolving after a few weeks to a few months. Persistent swelling of the same joint for 12 months or more is not a usual presentation.
- **Cardiac** – Cardiac involvement associated with Lyme disease includes intermittent atrioventricular heart block often involving the atrioventricular node (although heart block may occur at multiple levels) and sometimes associated with myopericarditis. Carditis can occur in the early stages of the disease.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

A69

A69.2 Lyme Disease (Erythema chronicum migrans due to *Borrelia burgdorferi*)

#### 6.2 ICD 9 Code(s)

### 7.0 Type of International Reporting

### 8.0 Comments

These are definitions for surveillance and epidemiologic purposes only, and they do not represent clinical case definitions.

## **Lyme Disease**

Nationally notifiable since 2009

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### **9.0 References**

1. Canadian Public Health Laboratory Network.  
*The laboratory diagnosis of Lyme borreliosis: guidelines from the Canadian Public Health Laboratory Network.* Can J Infect Dis Med Microbiol 2007;18:145-8.
2. Wormser GP, Dattwyler RJ, Shapiro ED et al.  
*The clinical assessment, treatment, and prevention of Lyme disease, human granulocytic anaplasmosis, and babesiosis: clinical practice guidelines by the Infectious Diseases Society of America.* Clin Infect Dis 2006; 43:1089-134.

**Date of Last Revision/Review:** May 2008

## **Worldwide Potential Bioterrorism Agents**

- Smallpox
- Viral Hemorrhagic Fever
  - *Crimean Congo*
  - *Ebola*
  - *Lassa*
  - *Marburg*
  - *Rift Valley*

## Smallpox

Nationally notifiable since 2000

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### 1.0 National Notification

*Confirmed, probable* and *suspect cases* of disease should be notified.

Contact the Public Health Agency of Canada immediately using the 24-hour emergency line 1-800-545-7661 even in the event of a suspected case.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Laboratory confirmation of infection:

- isolation of variola virus from an appropriate clinical specimen

OR

- detection of variola virus nucleic acid

#### 3.2 Probable case

Clinical evidence of illness in a person who is epidemiologically linked to a laboratory-confirmed case or to a probable case

OR

Laboratory evidence of infection:

- negative stain electron microscopic identification of variola virus in an appropriate clinical specimen

#### 3.3 Suspect case

Clinical evidence of illness in a person who is not epidemiologically linked to a laboratory-confirmed case or to a probable case of smallpox

OR

Atypical lesion known to be associated with the variola virus on a person who is epidemiologically linked to a laboratory-confirmed or probable case

### 4.0 Laboratory Comments

Any testing related to suspected smallpox should be carried out under level 4 containment facilities at NML.

Contact the Public Health Agency of Canada immediately using the 24-hour emergency line (1-800-545-7661), even in the event of a suspected case, in order to activate the ERAP program.

### 5.0 Clinical Evidence

Smallpox is characterized by a febrile prodrome consisting of fever  $> 38.3^{\circ}\text{C}$  and systemic symptoms (prostration, headache, back pain, abdominal pain and/or vomiting), which generally lasts one to four days and is followed by the development of a characteristic rash. The rash consists of deep, firm, well-circumscribed pustules that are mostly all in the same stage of development. The lesions are characteristically umbilicated. The lesions initially appear as macules, evolving into papules, vesicles and then pustules in a matter of days. Finally, crusted scabs form; they then fall off several weeks after the initial appearance of the rash. Lesions initially appear in the oral mucosa/palate and then progress in a centrifugal pattern to involve the face, arms, legs, palms and soles. Atypical presentations include flat velvety lesions that do not evolve into pustules and more severe forms with confluent or hemorrhagic lesions.

## Smallpox

Nationally notifiable since 2000

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### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

B03

#### 6.2 ICD-9 Code(s)

050

### 7.0 Type of International Reporting

Mandatory reporting to WHO in accordance with the International Health Regulations (2005)

Elimination or eradication efforts should be reported.

### 8.0 Comments

It should be noted that the US Centers for Disease Control and Prevention (CDC), Emergency Preparedness and Response, provides slightly different case definitions. The CDC case definitions can be found at <http://www.bt.cdc.gov/agent/smallpox/diagnosis/casedefinition.asp>

### 9.0 References

Case definitions for diseases under national surveillance. *CCDR* 2000;26(S3). Retrieved May 2008, from <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/00vol26/26s3/index.html>

Communicable Diseases Network Australia. Interim Surveillance Case Definitions for the Australian National Notifiable Diseases Surveillance System. Version 1.1. 2004:61. Retrieved May 29, 2007 from

[http://www.health.gov.au/internet/wcms/publishing.nsf/Content/cda\\_surveil-nndss-dislist.htm#casedefs](http://www.health.gov.au/internet/wcms/publishing.nsf/Content/cda_surveil-nndss-dislist.htm#casedefs)

Damon I. Orthopoxviruses: vaccinia (smallpox vaccine), variola (smallpox), monkeypox and cowpox. In: Mandell GL, Bennett JE, Dolin R, eds. *Principles and Practice of Infectious Diseases*. 6<sup>th</sup> ed. Vol 2. Philadelphia: Churchill Livingstone. Elsevier, 2006.

World Health Organization. Fifty-eighth World Health Assembly. Resolution WHA58.3: Revision of the *International Health Regulations*. 2005. Retrieved May 8, 2007 from [www.who.int/gb/ebwaha/pdf\\_files/WHA58/WHA58\\_3-en.pdf](http://www.who.int/gb/ebwaha/pdf_files/WHA58/WHA58_3-en.pdf)

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## Viral Hemorrhagic Fever

Nationally notifiable since 2000

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### 1.0 National Notification

This section includes the case definition for viral hemorrhagic fevers, which includes Lassa (*Arenaviridae*), Crimean Congo, Rift Valley fever (*Bunyaviridae*), Ebola and Marburg (*Filoviridae*).

*Confirmed, probable and suspect cases* of disease should be notified.

Contact the Public Health Agency of Canada immediately using the 24-hour emergency line 1-800-545-7661 even in the event of a suspected case.

### 2.0 Type of Surveillance

Routine case-by-case notification to the federal level

### 3.0 Case Classification

#### 3.1 Confirmed case

Suspect or probable case with laboratory confirmation of infection:

- detection of virus-specific RNA by reverse-transcriptase PCR from an appropriate clinical specimen (e.g. blood, serum, tissue)

AND

- demonstration of virus antigen in an appropriate clinical specimen (e.g. blood, serum, tissue) by enzyme immunoassay (EIA)

OR

One of the above criteria plus laboratory confirmation using at least one of the following:

- demonstration of virus antigen in tissue (skin, liver or spleen) by

immunohistochemical or immunofluorescent techniques

- demonstration of specific IgM antibody by EIA, immunofluorescent assay or Western Blot
- demonstration of a fourfold rise in IgG serum antibody by EIA, immunofluorescent assay or Western Blot
- reverse-transcriptase PCR on an independent target gene and/or independent sample or confirmation through another reference laboratory

OR

Isolation of virus from an appropriate clinical specimen (blood, serum, tissue, urine specimens or throat secretions)

#### 3.2 Probable case

Clinical evidence of illness and a history within the three weeks before onset of fever of one of the following:

- travel in a specific area of a country where an outbreak of viral hemorrhagic fever (VHF) has recently occurred
- contact with a suspect, probable or confirmed case
- direct contact with blood or other body fluid secretions or excretions of a person or animal with a confirmed or probable case of VHF
- work in a laboratory or animal facility that handles hemorrhagic fever viruses

#### 3.3 Suspect case

Clinical evidence of illness

## Viral Hemorrhagic Fever

Nationally notifiable since 2000

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### 4.0 Laboratory Comments

Any testing related to suspected VHF should be carried out under level 4 containment facilities (NML) because of issues of security, expertise and personnel vaccination.

Contact the Public Health Agency of Canada immediately using the 24-hour emergency line (1-800-545-7661), even in the event of a suspected case, in order to activate the ERAP program.

### 5.0 Clinical Evidence

**Crimean Congo VHF:** Acute viral illness consisting of sudden onset of fever, malaise, generalized weakness, anorexia, irritability, confusion, headache and pain in the limbs and groin. Fever generally lasts 5-12 days and is followed by a prolonged convalescent phase. Acute symptoms are usually accompanied by flushing, conjunctival injection and petechial or purpuric rash involving mucosal surfaces, chest and abdomen. Vomiting, abdominal pain and diarrhea are occasionally seen. Bleeding may be seen from gums, nose, lungs, uterus and GI tract. There is often thrombocytopenia, mild hematuria and proteinuria, and evidence of hepatic involvement. Severe cases may be associated with liver failure.

**Lassa VHF:** Acute viral illness lasting one to four weeks. Gradual onset of symptoms, including fever, headache, generalized weakness, malaise, sore throat, cough, nausea, vomiting, diarrhea, myalgia, and chest and abdominal pain. Fever may be persistent or intermittent. Inflammation and exudation of the pharynx and conjunctivae is commonly observed. Many cases are mild or asymptomatic. Severe cases may result in

hypotension, shock, pleural effusion, hemorrhage, seizures, encephalopathy and proteinuria, resulting in edema of the face and neck.

**Ebola and Marburg VHF:** Severe acute viral illness consisting of sudden onset of fever, malaise, myalgia, headache, conjunctival injection, pharyngitis, vomiting and diarrhea that can be bloody. It is often accompanied by a maculopapular or petechial rash that may progress to purpura. Bleeding from gums, nose, injection sites and GI tract occurs in about 50% of patients. Dehydration and significant wasting occur as the disease progresses. In severe cases, the hemorrhagic diathesis may be accompanied by leucopenia; thrombocytopenia; hepatic, renal and central nervous system involvement; or shock with multi-organ dysfunction.

**Rift Valley VHF:** Human infections with Rift Valley fever are usually associated with a brief, self-limited febrile illness. Most patients experience sudden onset of fever, malaise, severe myalgias with lower back pain, chills, headache, retro-orbital pain, photophobia and anorexia. Fever usually lasts for four days. In a minority of patients, fever returns after two or three days accompanied by return of symptoms as well as flushed face, nausea, vomiting and injected conjunctivae. Severe disease is associated with bleeding, shock, anuria and icterus. Encephalitis and retinal vasculitis can also occur.

### 6.0 ICD Code(s)

#### 6.1 ICD-10 Code(s)

- Crimean Congo VHF: A98.0
- Lassa VHF: A96.2
- Ebola VHF: A98.4
- Marburg VHF: A98.3
- Rift Valley VHF: A92.4

## Viral Hemorrhagic Fever

Nationally notifiable since 2000

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### 6.2 ICD-9 Code(s)

- Crimean Congo VHF: 065.0
- Lassa VHF: 078.89
- Ebola VHF: 065.8
- Marburg VHF: 078.8
- Rift Valley VHF: 066.3

### 7.0 Type of International Reporting

Mandatory reporting to the WHO if illness constitutes a public health emergency of international concern (PHEIC) as defined by the International Health Regulations (2005).

### 8.0 Comments

### 9.0 References

Case definitions for diseases under national surveillance. *CCDR* 2000;26(S3). Retrieved May 2008, from <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/00vol26/26s3/index.html>

World Health Organization. Department of Communicable Disease Surveillance and Response (October 1999). *WHO Recommended Surveillance Standards*. 2<sup>nd</sup> ed. WHO/CDS/CSR/ISR/99.2. Retrieved on May 9, 2007, from [www.who.int/csr/resources/publications/surveillance/whocdscsr992.pdf](http://www.who.int/csr/resources/publications/surveillance/whocdscsr992.pdf)

Peters CJ. Marburg and Ebola virus hemorrhagic fevers. In: Mandell GL, Bennett JE, Dolin R, eds. *Principles and Practice of Infectious Diseases*. 6<sup>th</sup> ed. Vol 2. Philadelphia: Churchill Livingstone. Elsevier, 2006.

Watts DM, Flic R, Peters C, Shope RE. (2006). Bunyaviral fevers: Rift Valley fever and Crimean-Congo hemorrhagic fever. In: Guerrant RL, Walker DH, Weller PF. *Tropical Infectious Diseases: Principles, Pathogens and Practice*. 2<sup>nd</sup> ed. Philadelphia: Churchill Livingstone. Elsevier, 2006.

Enria D, Mills JN, Flick R et al. Arenavirus infections. In: Guerrant RL, Walker DH, Weller PF. *Tropical Infectious Diseases: Principles, Pathogens and Practice*. 2<sup>nd</sup> ed. Philadelphia: Churchill Livingstone. Elsevier, 2006.

Peters CJ, Zaki SR. Overview of viral hemorrhagic fevers. . In: Guerrant RL, Walker DH, Weller PF. *Tropical Infectious Diseases: Principles, Pathogens and Practice*. 2<sup>nd</sup> ed. Philadelphia: Churchill Livingstone. Elsevier, 2006.

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