

Appendix B: Provincial Case Definitions for Diseases of Public Health Significance

Disease: Diphtheria

Revised: February 2019

Diphtheria

1.0 Provincial Reporting

Confirmed and probable cases of disease

2.0 Type of Surveillance

Case-by-case

3.0 Case Classification

3.1 Confirmed Case

Clinical illness (see section 5.0) and at least one of the following:

- Isolation of *Corynebacterium diphtheriae* (*C. diphtheriae*) with confirmation of toxin from an appropriate clinical specimen (e.g. throat, nasal, nasopharyngeal or cutaneous sites, exudate of membrane)

OR

- Isolation of other toxigenic *Corynebacterium* species (*Corynebacterium ulcerans* [*C. ulcerans*] or *Corynebacterium pseudotuberculosis* [*C. pseudotuberculosis*]) from an appropriate clinical specimen (e.g. throat, nasal, nasopharyngeal or cutaneous sites, exudate of membrane)

OR

- Histopathologic diagnosis of diphtheria

OR

- Epidemiological link to a laboratory-confirmed case (contact within two weeks prior to onset of symptoms)

3.2 Probable Case

- Clinical illness (see section 5.0) in the absence of laboratory confirmation or in the absence of an epidemiological link to a laboratory-confirmed case.

4.0 Laboratory Evidence

4.1 Laboratory Confirmation

The following will constitute a confirmed case of diphtheria:

- Isolation of *C. diphtheriae*, *C. ulcerans* or *C. pseudotuberculosis* with confirmation of toxin from an appropriate clinical specimen;
- Histopathologic diagnosis of diphtheria.

4.2 Approved/Validated Tests

- Standard culture for *C. diphtheriae*, *C. ulcerans* or *C. pseudotuberculosis*.
- Elek* test for toxin detection.
- Consult with the laboratory prior to testing to discuss specimen collection and testing methodology.

4.3 Indications and Limitations

- All positive smears require follow-up testing for confirmation.
- Exclusive use of direct-stained smears to diagnose diphtheria is unreliable and not recommended.
- Nucleic acid amplification testing (NAAT) for diphtheria toxin gene may be performed. Positive NAAT results must be confirmed by a positive modified Elek test.
- Diphtheria serology testing has been discontinued at the Public Health Ontario Laboratories.
- Further strain characterization (i.e. biotype testing) may be indicated for epidemiological, public health and control purposes.

5.0 Clinical Evidence

Clinical illness is characterized as an upper respiratory tract infection (nasopharyngitis, laryngitis or tonsillitis) with 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; and/or
- Death, with no known cause.

* The Elek test is an immunoprecipitation-based assay named after the bacteriologist S.D. Elek (1949) that is designed to determine if *Corynebacterium* isolates produce Diphtheria Toxin.

6.0 ICD 10 Codes(s)

A36 Diphtheria

7.0 Comments

Although rare, other toxigenic *Corynebacterium* species (*C. ulcerans* or *C. pseudotuberculosis*) may cause clinical diphtheria. Isolation of other toxigenic *Corynebacterium* species in addition to clinically compatible illness is reportable.

8.0 Sources

Ontario, Ministry of Health and Long-Term Care. Diphtheria Guide for Health Care Professionals. Toronto, ON: Queen's Printer for Ontario; 2018. Available from: <http://www.health.gov.on.ca/en/pro/publications/disease/diphtheria.aspx>

Public Health Agency of Canada. Diphtheria. In: Case Definitions for Communicable Diseases under National Surveillance. Canada Communicable Disease Report. 2009;35S2.

Public Health Agency of Canada, National Microbiology Laboratory. Guide to Services: Diphtheria Toxin Testing Service [Internet]. Ottawa, ON: Her Majesty the Queen in Right of Canada; 2018 [cited April 17, 2018]. Available from: <https://cnphi.canada.ca/gts/faces/public/rdt.xhtml?rdtid=4393&lang=en&alphaReturn=alphaDisease.xhtml&alphaChar=D>

Public Health Ontario. Labstract - January 2010: Discontinuation of Diphtheria and Tetanus Serology testing at PHL [Internet]. Toronto, ON: Ontario Agency for Health Protection and Promotion; 2010 [updated January 1, 2010; cited June 27, 2014]. Available from:

<http://www.publichealthontario.ca/en/pages/Results.aspx?k=Discontinuation%20of%20diphtheria%20and%20tetanus%20serology%20testing%20at%20PHL>

Roush SW, Beall B, McGee L, Cassidy P, Bowen M, Icenogle J, et al. Laboratory support for the surveillance of vaccine-preventable diseases. 2017. In: Manual for the Surveillance of Vaccine-Preventable Diseases [Internet]. 6 ed. Atlanta, GA: Centers for Disease Control and Prevention. Available from:

<https://www.cdc.gov/vaccines/pubs/surv-manual/index.html>

9.0 Document History

Table 1: History of Revisions

Revision Date	Document Section	Description of Revisions
March 2017	General	New Template
March 2017	3.1 Confirmed Case	Removal of "...or systemic manifestations compatible with diphtheria in a person with an upper respiratory tract infection or infection at another site (e.g. wound, cutaneous)..."
March 2017	3.2 Probable Case	Addition of "Clinical illness (see section 5.0)..." Removal of "Clinically compatible signs and symptoms..."
March 2017	5.0 Clinical Evidence	Removal of "...or without..."
March 2017	8.0 Sources	Updated
March 2017	10.0 Document History	Updated
February 2019	General	Minor revisions were made to support the regulation change to Diseases of Public Health Significance and references were updated.

