

# Diphtheria – Guide for Health Care Professionals

Includes information on obtaining antitoxin

This fact sheet provides basic information only. It must not take the place of medical advice, diagnosis or treatment. Always talk to a health care professional about any health concerns you have, and before you make any changes to your diet, lifestyle or treatment.

*This information requires knowledgeable interpretation and is intended primarily for use by health care workers and facilities/organizations providing health care including pharmacies, hospitals, long-term care homes, community-based health care service providers and pre-hospital emergency services.*

## Diphtheria

Diphtheria is an acute toxin-mediated disease caused by the *Corynebacterium diphtheriae*. There are four biotypes of *C. diphtheriae* (*gravis*, *mitis*, *belfanti* and *intermedius*). Strains may be toxigenic or nontoxigenic. Invasive infection generally occurs with toxigenic strains.

## Symptoms

Diphtheria causes a membranous inflammation of the pharynx, larynx, trachea or posterior nasal passages and sometimes other mucous membranes and skin. It is characterized by the appearance of a firmly adherent, asymmetrical greyish white membrane in the pharynx and/or larynx surrounded by inflammation. The onset of disease is insidious and symptoms may initially be nonspecific with a moderate fever; however, symptoms may become severe with signs of toxicity, requiring treatment with diphtheria antitoxin.

Pharyngeal diphtheria is the most common form of diphtheria; however, laryngeal diphtheria is more likely to occur in young children less than 4 years of age. In the instance of pharyngitis without a membrane, other causative pathogens (such as streptococci) should have been excluded by culture.

## Important Numbers

- **Public Health Division: 416-327-7392 (during business hours)**
- **Public Health Division (after hours) can be reached by calling the Spills Action Centre: 416-325-3000 or 1-800-268-6060**
- **Special Access Program: 613-941-2108**

## Mode of Transmission

*C. diphtheriae* is an aerobic gram-positive bacillus. It is transmitted person to person through close respiratory and intimate contact. More rarely, it can also be transmitted through contact with articles soiled with discharge from lesions of infected person(s). Raw milk has also been identified as a source of infection.

## Incubation Period

Two to 5 days, occasionally longer.

## Complications

Serious complications from diphtheria include upper airway obstruction caused by extensive membrane formation, acute systemic toxicity, myocarditis and peripheral neuropathies.

## Provincial Case Definition

Diphtheria is a designated communicable and reportable disease in Ontario.

### Confirmed Case

A case is considered confirmed when there are clinically compatible signs and symptoms in a person with an upper respiratory tract infection or infection at another site **PLUS** at least one of the following:

1. Isolation of toxigenic *Corynebacterium diphtheriae* with confirmation of toxin from an appropriate clinical specimen (e.g. nasopharyngeal, nasal or cutaneous sites, exudate of membrane).  
**OR**
2. Histopathologic diagnosis of diphtheria  
**OR**
3. Epidemiological link to a laboratory-confirmed case (i.e., contact within 2 weeks prior to onset of symptoms)

### Probable Case

A probable case is one where there are clinically compatible signs and symptoms in the absence of laboratory confirmation or in the absence of an epidemiological link to a laboratory-confirmed case.

## What Should I Do If I Suspect a Diphtheria Case?

**Complete all of the following 5 steps:**

### Step 1- Obtain the appropriate laboratory specimen and forward the specimen to the Ontario Public Health Laboratory

The diagnosis of diphtheria is made by the isolation of toxigenic *Corynebacterium diphtheriae* from nasopharyngeal or pharyngeal sites. Obtain swabs for culture from the edge or underneath the membrane, if present. Two or more specimens will increase the chance of detection of the organism. Once the *C. diphtheriae* organism is isolated, the Ontario Public Health Laboratory performs the Elek test for the presence of the toxigenic strain. A comprehensive case history should be obtained to support the diagnosis pending lab confirmation.

### Step 2- Laboratory Investigation

The laboratory should be notified as soon as the diagnosis is suspected. Swabs from the throat, nasopharynx and membrane, if present, should be taken for culture before antibiotic therapy is initiated. Swabs should be placed in charcoal transport medium. For the detection of asymptomatic carriers, nasopharyngeal and throat swabs are useful (swab the tonsillar fossae, posterior pharynx and uvula). Specimens should be transported as soon as possible. A comprehensive case history should be obtained to support the diagnosis.

### Step 3- Treatment

Specimens should be collected to identify a toxigenic strain of *Corynebacterium diphtheriae* before the antitoxin is administered, but antitoxin should not be withheld pending test results if there are strong clinical indications for diphtheria.

Instructions outlined in the product monograph provided by the manufacturer should be followed carefully.

The **product monograph** for the Diphtheria Antitoxin can be found on the manufacturer's website at: <http://www.imz.hr/DAT-eng.pdf>

Diphtheria antitoxin can be obtained from the Protection & Prevention Branch, Public Health Division, Ministry of Health and Long-Term Care during the following hours:

### Business Hours

8:30am-4:30pm Monday to Friday: Call the Protection & Prevention Branch at 416-327-7392 and request to speak with the Nurse Consultant for diphtheria case management in the Vaccine Program.

### After-Hours, Weekends and Holidays:

Call the Spills Action Centre at 416-325-3000 or 1-800-268-6060 and request to speak to the Public Health Division (PHD) staff on call.

Please provide the PHD staff on call with the following:

- a) the name of the physician to whom the antitoxin should be sent

- b) the physician's contact telephone number
- c) the hospital name and address to which the antitoxin should be sent
- d) the name and telephone number of the hospital contact
- e) the name of the public health unit in which the hospital is located

The antitoxin should be administered as soon as possible.

The PHD staff on call will be the transfer coordinator and as such will be responsible for arranging the transportation and delivery of the diphtheria antitoxin. The PHD staff on call will notify the requesting physician of the estimated time of delivery.

The TagAlert temperature monitor is included in the cooler to ensure that the antitoxin is maintained under the required cold chain conditions during transport between +2 °C to +8°C at all times. If an alarm is triggered, the product would have been exposed to out-of-range temperatures. Please record the information displayed on the LCD and contact the PHD staff on call for additional information. The TagAlert temperature monitor is not a reusable device and must be disposed appropriately.

#### **Step 4- Call your local public health unit immediately**

Diphtheria is a reportable disease in Ontario under the *Health Protection and Promotion Act* and must be reported immediately to the local medical officer of health by telephone. This will ensure appropriate case and contact follow up for surveillance purposes. The disease should be reported even if it is only suspected and has not yet been confirmed by laboratory testing.

#### **Step 5- Complete the *Future Use Request Form* for the federal Special Access Program**

The *Future Use Request Form* must be completed by the attending physician as soon as possible after the initiation of the antitoxin, since the antitoxin is provided through the federal Special Access Program.

Complete and fax the *Future Use Request Form* that is enclosed with the antitoxin to the Nurse Consultant for diphtheria case management, Vaccine Program, Protection & Prevention Branch, Public Health Division, Ministry of Health and Long-Term Care at 416-327-7439. The form is also available online at [http://www.hc-sc.gc.ca/dhp-mps/acces/drugs-droques/sapf2\\_pasf2-eng.php](http://www.hc-sc.gc.ca/dhp-mps/acces/drugs-droques/sapf2_pasf2-eng.php) (if the link does not work, cut and paste it onto the address bar).

#### **Contact Management**

Please refer to the *Guidelines for Management of Cases and Prevention of Secondary Transmission* published in the Canada Communicable Disease Report, Vol.24S3, July 1998 for information on the management of contacts and carriers.

This document is available online at:

<http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/98vol24/24s3/index.html>

#### **References**

1. Wharton M, Vitek C. Diphtheria Toxoid. In *Vaccines*, 4<sup>th</sup> Edition. Plotkin SA, Orenstein WA (Eds). Saunders, Philadelphia: 2004.
2. Heymann DL (Ed). *Control of Communicable Diseases Manual*, 19<sup>th</sup> Edition. American Public Health Association, Washington D.C: 2008.
3. *2009 Red Book*, 28<sup>th</sup> edition, American Academy of Pediatrics: 2009.
4. Murray PR, Editor in Chief. *Manual of Clinical Microbiology*, 8<sup>th</sup> Edition. ASM Press, Washington, D.C.: 2003.
5. Public Health Agency of Canada, Guidelines for the Control of Diphtheria in Canada. Canada Communicable Disease Report Volume: 24S3 - July 1998. Available at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/98vol24/24s3/index.html>
6. Ministry of Health and Long-Term Care, Infectious Diseases Protocol, 2009. Appendix B: Provincial Case Definitions for Reportable Diseases: Diphtheria. Available at: [http://www.health.gov.on.ca/english/providers/program/pubhealth/oph\\_standards/ophs/progstds/idprotocol/appendixb/diphtheria\\_cd.pdf](http://www.health.gov.on.ca/english/providers/program/pubhealth/oph_standards/ophs/progstds/idprotocol/appendixb/diphtheria_cd.pdf)
7. Product Monograph, Diphtheria Antitoxin, Institute of Immunology, Inc., Croatia, 2006. Available at: [www.imz.hr/DAT-eng.pdf](http://www.imz.hr/DAT-eng.pdf)