

Diphtheria

Last updated: 01 July 2013

Public health priority:

Urgent

PHU response time:

Respond to probable and confirmed cases immediately

Enter confirmed cases on NDD within 1 working day

Case management:

Notify the Communicable Diseases Branch

Identify if the *Corynebacterium diphtheriae* is toxigenic

Isolate until culture-negative

Contact management:

Arrange for nose and throat swabs and antibiotic prophylaxis

Recommend relevant immunisations

Food handlers, child carers and child contacts excluded from work/school/child care until proven bacteriologically negative

Child care directors/school principals asked to notify any new cases promptly

1. Reason for surveillance

- To identify cases, and prevent further transmission
- To monitor the epidemiology and so inform the development of better prevention strategies.

2. Case definitions

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

Confirmed case

A confirmed case requires **laboratory definitive evidence** and **clinical evidence**.

Laboratory definitive evidence

Isolation of toxigenic* *Corynebacterium diphtheriae* or toxigenic* *C. ulcerans* from site of clinical evidence.

Clinical evidence – confirmed case

- Upper respiratory tract infection

OR

- Skin lesion

Probable case

A probable case requires:

Laboratory suggestive evidence and clinical evidence

OR

Clinical evidence and epidemiological evidence.

Laboratory suggestive evidence

Isolation of *C. diphtheriae* or *C. ulcerans* from a respiratory tract specimen (toxin production unknown).

Clinical evidence - probable case

Upper respiratory tract infection with an adherent membrane of the nose, pharynx, tonsils or larynx

Epidemiological evidence

An epidemiological link is established when there is:

Contact between two people involving a plausible mode of transmission at a time when:

a. one of them is likely to be infectious (usually 2 weeks or less and seldom more than 4 weeks after onset of symptoms)

AND

b. the other has an illness which starts within approximately 2-5 days after this contact

AND

At least one case in the chain of epidemiologically linked cases (which may involve many cases) is laboratory confirmed.

3. Notification criteria and procedure

Diphtheria is to be notified by:

- Hospital CEOs on clinical diagnosis (ideal reporting by telephone within 1 hour of diagnosis)
- Laboratories on microbiological confirmation (ideal reporting by telephone within 1 hour of diagnosis)
- School principals and directors of child care facilities (ideal reporting by telephone within 1 hour of notification).

Both confirmed and probable cases should be entered onto NDD.

4. The diseases

Infectious agent

The toxigenic bacillus *C. diphtheriae* or *C. ulcerans*.

Mode of transmission

Diphtheria is transmitted by droplet infection through contact with a patient or carrier, or rarely articles soiled with discharges from infected lesions. Asymptomatic carriage can occur (up to 5% of people in endemic regions) but is extremely rare in developed countries.

The probability of spread depends on the closeness and duration of contact. Prolonged contact (eg sleeping in the same room as a case rather than casual contact) is usually required.

Timeline

The typical incubation period is 2 to 5 days, occasionally longer. Diphtheria is communicable while virulent bacilli are present in discharges, usually for about 2 weeks, but seldom more than 4 weeks. Effective antibiotic therapy terminates communicability, usually by 48 hours.

Clinical presentation

The usual clinical presentation is an insidious onset of pharyngitis and/or laryngitis associated with a characteristic thick, adherent, grey-white membrane on the pharynx. Occasionally other mucous membranes can be involved. Cases may have enlarged anterior cervical lymph nodes, and oedematous surrounding tissue, producing a "bull neck" appearance.

Cutaneous diphtheria can also occur, generally without systemic symptoms. Lesions usually occur on exposed parts, especially the legs. They begin as vesicles and quickly form small, and sometimes multiple, well demarcated, ulcers.

Laryngeal disease is serious in infants and young children. The case fatality rate for non-cutaneous disease is 5 to 10 percent.

5. Managing single notifications

Response times

Investigation

Immediately on notification of a probable or confirmed case begin follow-up investigation. Notify the Communicable Diseases Branch.

Data entry

Within 1 working day of notification enter probable and confirmed cases on NDD.

Response procedure

The response to a notification will normally be carried out in collaboration with the case's health carers. But regardless of who does the follow-up, PHU staff should ensure that action has been taken to:

- Confirm the onset date and symptoms of the illness
- Confirm results of relevant pathology tests, or recommend the tests be done
- Find out if the case or relevant care-giver has been told what the diagnosis is before beginning the interview
- Seek the doctor's permission to contact the case or relevant care-giver
- Review the case and contact management
- Identify and control the likely source.

Case management

Investigation and treatment

Identify if the *Corynebacterium diphtheriae* is toxigenic. Isolates should be urgently referred to ICPMR for full identification and PCR and/or Elck test for toxin production.

Ask the case (or carer) about diphtheria immunisation status, travel history, and contact with other suspected cases. For toxigenic *C. ulcerans* cases, ask about consumption of raw milk, and contact with animals.

Ensure that the case has been isolated and begun treatment. If there is a strong suspicion of toxigenic diphtheria, the treating doctor should consider giving antitoxin without delay. Antitoxin is available from CD Oncall. Antibiotics are required to eliminate the organism and prevent spread. Erythromycin, azithromycin, clarithromycin, or penicillin are active in vitro against *C. diphtheria*. Specimens should be collected before beginning antibiotics. Treatment should continue for 14 days, and elimination confirmed by nasopharyngeal swab culture. If positive, retreat for 10 days.

Ensure that the case is age-appropriately immunised during convalescence, since infection does not always induce immunity.

Education

The case or relevant caregiver should be informed about the nature of the infection and the mode of transmission.

Isolation and restriction

Isolate with transmission-based precautions for pharyngeal diphtheria, until 2 cultures from both throat

and nose taken =24 hours apart, and =24 hours after cessation of antimicrobial therapy are negative for diphtheria bacilli.

Environmental evaluation

None usually required.

Contact management

Identification of contacts

Contacts are treated to avert incubating diseases and to prevent further spread. The risk of infection is related to closeness and duration of contact. Any one with close contact with the case in the previous 7 days may be at risk. risk factors and risk groups include:

- Sleeping in the same household as a case
- Kissing or sexual contact with a case
- Health care workers who perform mouth-to-mouth resuscitation, or who dress the wounds of a case with cutaneous disease
- Persons sleeping in the same area or sharing the same kitchen or in the same child care centre for several hours each day are also likely to have had significant contact.

The risk to other contacts depends on the duration of contact and immunisation status of the contact. These include:

- Persons regularly visiting the case's home
- School room contacts
- Persons sharing the same room at work
- Other health care workers in contact with the case.

Investigation and treatment

Investigation

Identify the risk of exposure to potential sources of infection. Ask contacts about recent travel since asymptomatic contacts may be the source of the index case's infection.

All contacts of toxigenic pharyngeal or laryngeal diphtheria (regardless of their immunisation status) should have nose and throat cultures taken and any wounds swabbed, and receive prompt antimicrobial prophylaxis. Contacts should be examined daily for 7 days for evidence of disease.

Passive immunisation

None.

Active immunisation

Previously immunised contacts should be given a single booster dose of ADT or DTP, while unimmunised contacts should be given a primary series of vaccinations.

Antibiotic prophylaxis

Benzyll penicillin IMI single dose:

- 600 000 units for children <6 years old and
- 1.2M units for those =6 years old) single dose; or

Erythromycin oral for 7 days:

- 125mg every 6 hours for children <2 years old
- 250mg every 6 hours for children 2-8 years old
- 250-500mg every 6 hours for those >8 years old.

Contacts with initially positive swabs should have follow up swabs cultured after completion of treatment. If positive, a further 10-day course of therapy is indicated.

Education

Advise susceptible contacts (or parents/guardians) of the risk of infection; counsel them to watch for

signs or symptoms of diphtheria occurring within 7 days of exposure. Medical care should be sought immediately and appropriate cultures obtained if symptoms develop.

Isolation and restriction

Food handlers or child carers should be advised not to attend work or school until proven bacteriologically negative. Child contacts should be excluded from school or child care facilities until two cultures from both throat and nose taken =24 hours apart, and =24 hours after cessation of antimicrobial therapy are negative for diphtheria bacilli.