
Diphtheria

Frequently asked questions

1. What is diphtheria?

Diphtheria is a contagious and potentially life-threatening bacterial infection. It is caused by infection with a toxin-producing strain of *Corynebacterium diphtheriae* or more rarely *Corynebacterium ulcerans* or *Corynebacterium pseudotuberculosis*. It occurs in two forms- respiratory diphtheria and cutaneous diphtheria.

2. Who can get diphtheria?

Children who are not immunized or who did not receive complete the Expanded Programme of Immunization (EPI) schedule, are at increased risk of getting diphtheria. Adults may also be at risk of contracting diphtheria if the organism is present in the community because adult immunity following vaccination wanes with time. Susceptible persons living in crowded conditions are at increased risk of getting the disease.

3. Where does diphtheria occur in South Africa?

Diphtheria is an uncommon disease in South Africa. Since the implementation of diphtheria immunization in South Africa in the 1950s, only sporadic cases of diphtheria, mostly involving children aged <15 years, have been identified and reported. Between January 2008 and March 2015, three laboratory-confirmed cases of respiratory diphtheria were reported: two from Western Cape Province (March 2008 and January 2010), and one from Eastern Cape Province (March 2009). An outbreak of diphtheria in KwaZulu-Natal Province involving 15 confirmed cases occurred during March to June 2015. Two cases of diphtheria were identified also from KwaZulu-Natal Province in 2016.

4. How is diphtheria transmitted?

C. diphtheriae spreads from person to person through contact with respiratory droplets or hand-to-mouth contact with secretions from an infected person's mouth, nose, throat or skin. Sometimes, persons can carry the microorganism in their throat but have no symptoms. These persons can also spread the organism through respiratory droplets. Less frequently, the infection can be transmitted through close contact with skin lesions in a person with the cutaneous form of the illness. Prolonged close contact is normally required for the infection to be transmitted to others. Diphtheria caused by *C. ulcerans* or *C. pseudotuberculosis* can also spread through contaminated milk or close contact with infected animals (e.g. through working on a farm or as a veterinarian).

5. How does diphtheria affect animals?

Humans are the only known natural host for *C. diphtheriae*. *C. ulcerans* and *C. pseudotuberculosis* are zoonoses and cause mastitis and lymphadenitis in cattle.

6. What are the signs and symptoms of diphtheria?

Symptoms of respiratory diphtheria usually start 2 to 5 days after exposure, although the incubation period can be longer (range 1 to 10 days). Initial signs and symptoms include fever, malaise, chills, loss of appetite, sore throat, nausea and vomiting. Within days, a whitish/greyish pseudomembrane may form over the throat and tonsils that can make it hard to swallow and breathe. Typically the membrane is adherent to the pharynx and cannot be dislodged. The 'membrane' is actually necrotic tissue. The infection can also cause the lymph glands and tissue on both sides of the neck to swell (bull neck). Complications of diphtheria include respiratory obstruction, and myocarditis with cardiac arrest or cardiac failure. The cutaneous form of diphtheria often presents as a non-healing ulcer with a dirty grey membrane.

7. How is diphtheria diagnosed?

Respiratory diphtheria is first suspected clinically in a patient with pharyngitis by the presence of an adherent pharyngeal pseudomembrane and fever, with or without a bull neck. The diagnosis is confirmed by culture of the organism from a pharyngeal or wound swab. Clinicians should label the swab 'suspected diphtheria'. The laboratory will plate the organism onto selective media. Once the organism has been identified as *C. diphtheriae*, it will be subjected to PCR testing for the *tox* gene, which is responsible for toxin production, and to ELEK testing, to determine if toxin production is 'switched on'.

8. How is diphtheria treated?

Patients should be given diphtheria antitoxin (DAT) to neutralize the diphtheria toxin. The decision to give diphtheria antitoxin is based on clinical diagnosis, and should not wait for laboratory confirmation. Antibiotics have not been demonstrated to affect healing of local infection. However, they are used to eliminate *C. diphtheriae* from the nasopharynx and prevent its spread to others.

9. How can diphtheria be prevented?

Diphtheria is prevented by immunisation with diphtheria containing vaccine. In South Africa, the Expanded Program on Immunisation (SA-EPI) schedule includes 6 doses of diphtheria vaccine. The primary series of vaccination is given in 3 doses at 6, 10 and 14 weeks of age using diphtheria toxoid given in combination with other antigens. Boosters are given at 18 months and 6 and 12 years of age respectively. Following exposure to a case of diphtheria, contacts (persons sharing meals or living in the same house, or caring for infected children, or health care workers who have conducted CPR, or procedures involving contact with respiratory secretions) should receive chemoprophylaxis, booster vaccination and should have a throat swab to determine carriage status.

10. Where can I find out more information?

Guidelines and other useful resources are available on the NICD website: www.nicd.ac.za. For more information contact:

- Medical/clinical related queries: contact NICD Hotline number +27 (0) 82 883 9920 (for use by healthcare professionals only)
- Laboratory related queries
 - Centre for Respiratory Diseases and Meningitis: (Linda de Gouveia 011-555-0327 lindad@nicd.ac.za, Mignon du Plessis 011-555-0387 mignond@nicd.ac.za or Nicole Wolter 011-555-0352 nicolew@nicd.ac.za)
- Results enquiries: Centre for Respiratory Diseases and Meningitis laboratory (011-555-0315/7/8)