

# Diphtheria

Diphtheria is a contagious and potentially life-threatening infection caused by a toxin (poison) made by bacteria. Cases of diphtheria are rare in Australia due to the introduction of an effective vaccine, but a century ago diphtheria was the most common infectious cause of death. Outbreaks still occur in countries with low vaccination rates.

There are four different types of diphtheria:

- classical respiratory diphtheria
- laryngeal diphtheria
- nasal diphtheria and
- cutaneous diphtheria (skin lesions).

Respiratory and cutaneous diphtheria are caused by toxic strains of the bacteria *Corynebacterium diphtheriae* and *Corynebacterium ulcerans* and very rarely *Corynebacterium pseudotuberculosis*. These toxins can lead to serious complications such as paralysis and heart failure.

## Signs and Symptoms:

Symptoms usually begin two to five days after exposure to the bacteria but sometimes appear up to 10 days after exposure. Symptoms will depend on the type of diphtheria infection.

With respiratory diphtheria a person can experience a sore throat, fever, enlarged lymph nodes and swelling of the soft tissues on both sides of the neck sometimes referred to as a 'bull neck'. Within two or three days a membrane (a white or grey film) forms over the throat and tonsils that can make it difficult for the person to swallow and breathe.

Laryngeal diphtheria affects the voice-box. It most commonly occurs in children and is characterised by gradually increasing hoarseness and stridor (noisy breathing).

Nasal diphtheria is usually a mild but chronic illness. It is characterised by a nasal discharge which starts out clear but later becomes blood-stained.

Cutaneous diphtheria affects the skin, and usually appears as small ulcers on exposed limbs, particularly the legs.

## Treatment:

Depending on the severity of symptoms, a person with diphtheria may need to be admitted to hospital for appropriate care and treatment with antibiotics. After completing a course of antibiotics, the person will then undergo further testing to ensure that the antibiotics have been effective in clearing the bacteria, and that they are no longer infectious. For confirmed or highly probable cases of respiratory diphtheria, diphtheria antitoxin (DAT) can be given in a hospital setting to reduce the likelihood of serious complications.

## Preventing disease spread

- Besides antibiotic treatment, people with diphtheria need to be kept in isolation until they are proven to be free of the disease. Their diphtheria vaccination status will be checked and a booster dose given if needed.
- People in close physical contact with an infected person need to be checked to see if they have the bacteria. This is usually done by taking swabs from the nose and throat, and from any skin lesions. After the swabs have been taken, close contacts should be prescribed a course of antibiotics, and have their vaccination status checked. Previously vaccinated contacts should receive a booster dose of diphtheria vaccine if it has been more than 5 years since their last dose. Unvaccinated or incompletely vaccinated contacts will need to complete a full course of diphtheria vaccination.
- Contacts whose work involves food handling or caring for children will need to be excluded from work until they are proven to be free of infection.
- Children who are close contacts of a person with diphtheria will need to be excluded from child care or school until cleared to return by a Queensland Health public health unit.

## Transmission:

### *Corynebacterium diphtheriae* (*C. diphtheriae*)

Humans are the only known host for *C. diphtheriae*. The bacteria is usually spread by air-borne droplets from the nose or throat of an infected person, or through direct contact with infected respiratory secretions or skin lesions. Diphtheria is not highly contagious and prolonged close contact is normally required for the infection to be transmitted to others.

### *Corynebacterium ulcerans* (*C. ulcerans*)

Unlike *C. diphtheriae*, *C. ulcerans* is a zoonotic infection – an infection that can be passed from animals to humans - and is found in a wide range of wild and domestic animals. Infection in humans has been associated with the consumption of unpasteurised milk, or through prolonged close contact with livestock. More recently however, cases have been reported after close contact with domestic and companion animals. Although person-to-person spread has not been clearly demonstrated for *C. diphtheriae*, there have been cases where the bacteria were found in people

without symptoms who were close contacts of cases (Wagner KS, 2010).

## Prevention:

Widespread vaccination against diphtheria is the only effective method of preventing the disease.

Diphtheria vaccination is part of the National Immunisation Program and is provided free of charge for:

- all children aged 2, 4 and 6 months of age with booster doses at 18 months and 4 years of age and Year 7 students as part of the School Immunisation Program.

Immunisation to protect against diphtheria is also recommended, but not funded, for:

- adults 50 years and over who have not received a booster dose of diphtheria-tetanus vaccine in the past 10 years
- people travelling to countries where diphtheria is common or where health services are difficult to access
- people undertaking high risk travel.

Seek advice from your GP or travel doctor.

The diphtheria vaccine is available for adolescents/adults as a combined vaccine, either as diphtheria-tetanus-pertussis (whooping cough) or diphtheria-tetanus vaccine.

Like all medications, vaccines may have side effects. Most side effects are minor, last a short time and do not lead to any long-term problems. Possible side effects may include fever, redness and soreness where the injection was given, nausea, headache, tiredness and aching muscles. More serious side effects are extremely rare and can include severe allergic reactions. Contact your immunisation provider if you or your child has a reaction following vaccination which you consider serious or unexpected.

## Other resources:

13 HEALTH (call 13 43 25 84)

[Immunise Australia](https://www.health.gov.au/health-topics/immunisation) (<https://www.health.gov.au/health-topics/immunisation>) (call 1800 671 811)

[School Immunisation Program](https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/immunisation/schools) (<https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/immunisation/schools>)

## Help and assistance:

For more information about diphtheria, please contact your local doctor, community health centre, nearest public health unit. You can be immunised at your local doctor or medical centre. Check with your local council, community child health and community health centre regarding free immunisation clinics.

## References

Heymann, D., ed. 2015. Control of Communicable Diseases Manual, 20th edition. Washington, DC: American Public Health Association.

Australian Technical Advisory Group on Immunisation (ATAGI), 2018. [The Australian Immunisation Handbook](https://immunisationhandbook.health.gov.au/contents) (<https://immunisationhandbook.health.gov.au/contents>), Australian Government Department of Health, Canberra,

[Public Health England, 2015. Public health control and management of diphtheria \(in England and Wales\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/416108/Diphtheria_Guidelines_Final.pdf) ([https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/416108/Diphtheria\\_Guidelines\\_Final.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/416108/Diphtheria_Guidelines_Final.pdf)). London: PHE; 2015 [cited 12 October 2015].

Wagner KS, White JM, Crowcroft NS, De Martin S, Mann G, Efstratiou A. Diphtheria in the United Kingdom, 1986-2008: the increasing role of *Corynebacterium ulcerans*. *Epidemiol Infect.* 2010;138(11):1519-30.

## Health Insite:

[Diphtheria](https://www.healthdirect.gov.au/diphtheria) (<https://www.healthdirect.gov.au/diphtheria>)