CONDITION

Diphtheria

Diphtheria is a bacterial infection that can damage the airways, heart, and nerves through a harmful toxin.

WHAT IT IS
Toxin-producing bacterial infection of the throat or skin

BODY SYSTEM
Airways, skin, heart, and nervous system

MAIN SYMPTOMS
Sore throat, fever, neck swelling, grey throat coating

WHAT CAUSES IT
Infection with toxin-producing Corynebacterium bacteria

HOW IT IS DIAGNOSED
Bacterial culture plus toxin testing of throat or skin samples

MAIN TREATMENT
Antitoxin, antibiotics, isolation, and supportive hospital care

CAN IT BE CURED?
Yes - prompt antitoxin and antibiotics

IS IT AN EMERGENCY?
Yes - suspected throat infection needs immediate assessment

LONG-TERM OUTLOOK
Often full recovery; heart or nerve damage may persist

Overview

Diphtheria is a serious bacterial infection that most often affects the nose and throat, although it can also infect the skin. It is uncommon in countries with high vaccination rates, but cases and outbreaks still occur.

The bacteria can produce a harmful toxin. In the throat, this may damage tissue and form a thick grey or white coating called a pseudomembrane . Unlike mucus, this coating is firmly attached and may bleed if someone tries to remove it.

The toxin can travel through the bloodstream and damage the heart, nerves, or kidneys. Treatment works best when started early, so clinicians may begin it before laboratory results confirm the infection.

Diphtheria can spread to other people. Infection specialists and public health teams help manage suspected or confirmed cases and arrange testing, vaccination, or preventive antibiotics like amoxicillin or doxycycline for close contacts when needed.

Symptoms

Symptoms usually begin several days after exposure and may initially resemble another throat infection.

Diphtheria affecting the throat or airways can cause:

Severe neck swelling is sometimes called a "bull neck," although it does not occur in every case.

Skin diphtheria usually causes a slow-healing sore or ulcer, sometimes with a grey coating, defined edges, redness, swelling, pain, or crusting. It may be milder than throat infection but can still spread the bacteria.

Some people carry diphtheria bacteria without feeling unwell and can pass them on.

Toxin-related symptoms may appear after throat symptoms begin. They include an abnormal heartbeat, chest discomfort, weakness, swallowing problems, speech changes, blurred or double vision, or reduced movement in an arm or leg.

- Sore throat, painful swallowing, or a hoarse voice
- Mild fever, tiredness, and reduced appetite
- Swollen glands and soft-tissue swelling in the neck
- A thick grey or white coating in the throat or on the tonsils
- Nasal discharge, sometimes containing blood
- Noisy, difficult, or rapid breathing

Causes and risk factors

Diphtheria is caused mainly by toxin-producing strains of Corynebacterium diphtheriae . Related bacteria, including Corynebacterium ulcerans , can occasionally cause a similar illness.

The bacteria spread mainly through respiratory droplets from coughing, sneezing, or close face-to-face contact. They can also spread through infected skin sores or contaminated objects. Close contact is usually needed.

Some C. ulcerans infections have been linked to infected animals or unpasteurised dairy

products. Person-to-person spread of this species appears less common.

Risk is higher if you:

Vaccination greatly reduces the risk of severe illness, but protection may decrease over time. No vaccine is completely protective, so symptoms after a known exposure still need medical assessment.

- Have not received recommended diphtheria vaccinations
- Have not had recommended boosters
- Have close contact with an infected person
- Live in or visit an area where diphtheria is circulating
- Spend time in crowded settings with low vaccination coverage
- Have contact with an infected skin wound

Diagnosis

A clinician may suspect diphtheria based on symptoms, vaccination history, recent travel, possible exposure, and the appearance of the throat or skin. A firmly attached grey throat coating is an important clue, but it is not always present.

Samples are taken from the throat, nose, skin wound, or beneath the edge of the membrane. Laboratory culture looks for the bacteria, while further testing determines whether they carry and produce diphtheria toxin.

A polymerase chain reaction, or PCR, test can detect genes linked to toxin production. Additional tests may confirm whether the bacteria are actively producing toxin.

Testing must not delay treatment when respiratory diphtheria is strongly suspected. Do not try to scrape off the throat coating because this may cause bleeding and worsen airway problems.

Blood tests, an electrocardiogram, and heart monitoring may be used to identify complications. Other tests depend on symptoms, including signs of kidney or nerve damage.

Treatment and management

Suspected respiratory diphtheria usually requires urgent hospital care and isolation to reduce transmission.

Treatment generally includes:

Diphtheria antitoxin is made using antibodies from horses. Because serious allergic reactions can occur, it is given where the person can be closely monitored and treated immediately if necessary. Availability differs by country.

Isolation generally continues until treatment is complete and follow-up samples show that the bacteria have cleared. If samples remain positive, further antibiotics and repeat testing may be required.

Having diphtheria does not reliably produce lasting immunity. Vaccination or completion of the vaccine series is recommended during recovery according to previous vaccination history and the local schedule.

Public health teams identify close contacts. They may arrange symptom checks, throat or nose samples, preventive antibiotics, and a vaccine booster. These precautions do not mean the contact has diphtheria.

- Diphtheria antitoxin: Binds to toxin still circulating in the blood. It cannot reverse toxin damage already inside cells, so early treatment is essential.
- Antibiotics: Clear the bacteria, limit spread, and reduce further toxin production.
- Supportive care: May include fluids, nutrition, oxygen, heart monitoring, or breathing support.
- Rest and observation: Activity may be restricted if there are signs of heart inflammation.

Complications

The most immediate complication is airway blockage caused by swelling and the thick throat membrane.

The toxin may inflame the heart muscle, causing myocarditis . This can lead to chest pain, breathlessness, an abnormal rhythm, heart failure, or sudden collapse. Heart problems may develop even as throat symptoms improve.

Nerve damage can affect swallowing, speech, eye muscles, limbs, or breathing muscles. These symptoms sometimes begin weeks after the original infection.

Other complications include pneumonia, kidney injury, poor nutrition from swallowing problems, and infection of damaged skin. Severe diphtheria can be fatal despite treatment, especially if antitoxin is delayed or the airway, heart, or nerves are badly affected.

Skin diphtheria is less likely to cause major toxin-related complications, but it can occur alongside throat infection and still spread to others.

Prevention

Vaccination can prevent most diphtheria. The vaccine contains an inactivated form of the toxin, called a toxoid , which teaches the immune system to protect against its effects. It cannot cause diphtheria.

The vaccine is usually combined with vaccines against tetanus and whooping cough. Children receive a primary series, followed by boosters because protection decreases over time. Schedules vary by age, previous vaccination, pregnancy, health history, and country.

Other preventive measures include:

Hand hygiene can reduce spread but does not replace vaccination or public health measures after close exposure.

- Keeping routine vaccinations and boosters up to date
- Seeking travel-health advice before visiting an affected area
- Avoiding direct contact with an infected person's secretions or wounds
- Following isolation, testing, antibiotic, and vaccination advice after exposure
- Avoiding unpasteurised milk and dairy products

Living with it and what to expect

Diphtheria is usually a short-term infection rather than a lifelong condition. Antibiotics clear the bacteria, while antitoxin limits further toxin damage. Many people recover fully when treatment begins early.

Throat symptoms may improve within days, but tiredness and weakness can continue for weeks. A clinician may recommend returning gradually to school, work, exercise, and other activities.

Heart inflammation may require prolonged rest, repeat heart tests, and follow-up for several months. Nerve damage often improves slowly over weeks or months, although some people have lasting weakness or other problems.

Follow-up cultures are important because feeling better does not prove that the bacteria have cleared. Isolation continues until the treating and public health teams confirm it is safe to stop.

Vaccination remains necessary after recovery because infection does not guarantee future protection. People with heart, breathing, swallowing, or nerve problems may also need rehabilitation and specialist follow-up.

When to get medical help

Seek urgent medical assessment now if you or someone in your care has a thick grey or white throat coating, marked neck swelling, or possible diphtheria symptoms after a known exposure or recent stay in an affected area. Call ahead before arriving so infection-control precautions can be arranged.

Call emergency services for:

Do not try to remove a throat membrane.

Contact a healthcare or public health service promptly if you have been identified as a close contact, even if you feel well. Preventive treatment works best when arranged without delay.

Follow-up may include vaccine review, repeat cultures, heart or nerve checks, and planning a gradual return to activity. New chest, breathing, swallowing, or weakness symptoms during recovery need prompt assessment.

- Difficulty breathing, noisy breathing, or blue or grey lips
- Drooling or inability to swallow
- Rapidly increasing neck swelling
- Chest pain, fainting, or a fast or irregular heartbeat
- Sudden severe weakness, paralysis, or difficulty staying awake

Common questions

Is diphtheria the same as strep throat?

No. Different bacteria cause these infections. Diphtheria may form a firmly attached throat membrane and release a toxin that damages the heart and nerves. Laboratory testing helps distinguish them.

Can I get diphtheria if I was vaccinated?

Yes, but vaccination greatly lowers the risk of severe illness. Protection may decrease over time, which is why boosters are used. Exposure or suspicious symptoms still require medical advice.

Is diphtheria contagious?

Yes. It spreads through close contact with respiratory secretions or infected skin sores. Antibiotics and isolation reduce spread, and follow-up samples confirm when the bacteria have cleared.

Can diphtheria be cured?

Antibiotics can usually clear the bacteria. Antitoxin prevents circulating toxin from causing more damage but cannot undo existing damage. Early treatment offers the best chance of recovery.

Why do I need vaccination after having diphtheria?

Natural infection does not always produce enough lasting immunity. Vaccination after recovery provides more reliable protection.

How long does recovery take?

Uncomplicated throat symptoms may improve within days, although tiredness can last longer. Heart or nerve complications may require months of monitoring and recovery.

Sources

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