



**Diphtheria Vaccination Program  
Question and Answers**

Prepared by

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## **Diphtheria Vaccination Program Questions and Answers**

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*Adapted from the Immunization Action Coalition (with permission) and the Centers for Disease Control and Prevention (CDC).*

## Diphtheria- The Disease

### Overview

#### 1) How common is diphtheria in the United States?

Diphtheria was once the leading cause of death among children in the United States. Diphtheria was feared greatly. In the 1920s, 100,000-200,000 cases of diphtheria occurred each year resulting in 13,000-15,000 deaths. Diphtheria is now rare (fewer than five cases reported per year since 1980) thanks to improved living conditions and widespread immunization. However, recent surveys show that up to 60% of adults in the U.S. are not protected against diphtheria.

Protection provided by childhood immunization decreases over time and many adults do not receive recommended booster doses (every 10 years). This is a concern because diphtheria the disease continues to occur in other parts of the world. From 1990 to 1998, more than 150,000 cases and more than 5,000 deaths were reported in the former republics of the Soviet Union. This outbreak, and others around the world, illustrates what can happen when immunity levels fall. Outbreaks in other countries also increase the risk of diphtheria importation into the United States.

#### 2) What causes diphtheria?

Diphtheria is caused by a bacterium called *Corynebacterium diphtheriae*. The actual cause of disease is not the bacteria itself but a toxin, or poison, released into the body by the bacteria.

#### 3) How does diphtheria spread?

Diphtheria bacteria live in the mouth, throat, and nose of an infected person and can be passed to others by coughing or sneezing. Occasionally, transmission occurs from skin sores or through objects soiled with discharge from sores of infected persons.

#### 4) How long does it take to show signs of diphtheria after being exposed?

The incubation period is short: 2 to 5 days, with a range of 1 to 10 days.

### Symptoms

#### 1) What are the symptoms of diphtheria?

Early symptoms of diphtheria may mimic a cold with a sore throat, mild fever, and chills. Diphtheria often causes a thick coating at the back of the throat, which can make it difficult to breathe or swallow. The nose, eyes, skin, heart and kidneys are other body sites affected

#### 2) How serious is diphtheria?

Diphtheria is a serious disease: 5% to 10% of people with diphtheria die. Death occurs twice as often in those (older than 40 years or younger than 5 years).

### Complications

#### 1) What are possible complications from diphtheria?

Most complications of diphtheria are due to diphtheria toxin. The toxin can cause swelling of the heart, leading to abnormal heart rhythms. It can also cause swelling of the nerves, which may cause temporary paralysis of some muscles. If the paralysis affects the diaphragm (the major muscle for breathing), the patient may develop pneumonia or respiratory failure. The thick membrane coating the

back of the throat may cause serious breathing problems, even suffocation.

### **2) How do I know if someone has diphtheria?**

The diagnosis of diphtheria can only be confirmed by laboratory testing. However, treatment is usually begun based on clinical suspicion, because early treatment improves the likelihood that a person recovers.

### **3) How long is a person with diphtheria contagious?**

About 48 hours after antibiotics are started, a person is no longer contagious. However, some individuals continue to carry diphtheria bacteria even after antibiotic therapy. This is called the carrier state. Carriers should continue treatment until three consecutive laboratory tests for diphtheria are negative. People caring for a patient with diphtheria should take standard contact precautions and ensure their diphtheria immunization is up-to-date.

## **Diphtheria- The Vaccine**

### **Overview**

#### **1) Is there a treatment for diphtheria?**

Diphtheria is treated with both antibiotics and with diphtheria antitoxin. Antitoxin is the name for antibodies that neutralize toxins. Diphtheria antitoxin is produced in horses and was first used in the United States in 1891. Antitoxin is not effective against toxin that is already attached to the body's tissues, but antitoxin will neutralize circulating poison and prevent the disease from getting worse. The patient should be tested for antitoxin sensitivity (because it is horse-derived) before administration.

#### **2) What kind of vaccine prevents diphtheria?**

The diphtheria vaccine consists of a modified toxin called a toxoid. The vaccine is made by growing the bacteria in a liquid medium and purifying and inactivating the toxin.

#### **3) When did the diphtheria vaccine become available?**

The first toxoid against diphtheria was developed around 1921, but was not widely used until the 1930's. In the 1940's, diphtheria was combined with pertussis vaccine and tetanus toxoid to make the combination DTP (or DTaP) vaccine for children.

Diphtheria toxoid (DT) is also combined in other vaccines:

- DT vaccine for the few children who cannot receive pertussis vaccine.
- Td vaccine for people 7 years or older (tetanus toxoid and a reduced dose of diphtheria toxoid).
- Tdap vaccine for people 10 years or older (tetanus toxoid with reduced doses of diphtheria toxoid and acellular pertussis vaccine).
- Diphtheria toxoid is not available as a single vaccine.

#### **4) Who recommends this vaccine?**

The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP) all recommend this vaccine.

#### **5) How safe is this vaccine?**

Serious reactions after immunization are rare. The most common reactions are soreness, redness, and swelling at the injection site. Other possible reactions may include fussiness, mild fever, loss of appetite, tiredness, and vomiting. The use of the more purified DTaP vaccine, instead of DTP has

decreased even these mild reactions.

**6) Can the vaccine cause diphtheria?**

No.

**7) Do I need to be immunized if I had diphtheria?**

Yes. Unfortunately, some people who suffer diphtheria illness do not produce enough antitoxin to prevent future illness. It is recommended that people recovering from diphtheria be immunized.

**8) What's the difference between DT and Td vaccines?**

The difference is the amount of diphtheria toxoid contained in each dose. Pediatric DT ("big D") contains 3 to 5 times more diphtheria toxoid than the adult Td ("little d"). DT is used for the few children who cannot receive the pertussis component of the DTaP vaccine, and Td is used for adults and children seven years of age and older who need booster doses of diphtheria and tetanus toxoid.

**9) Should adults who weren't immunized as children receive this vaccine as adults?**

Yes. Adults or children seven years and older without documentation of tetanus and diphtheria vaccination should receive a primary series of three doses of Tetanus-diphtheria toxoid (Td). The first two doses should be separated by 4 to 8 weeks, and the third dose given 6 to 12 months after the second dose. Td will protect you from diphtheria infection as well as tetanus.

**Administration**

**1) How is the vaccine given?**

The vaccine is given as a single injection into the muscle (IM). The usual schedule for infants is a series of four doses given at two, four, six, and 15 to 18 months of age. A fifth shot, or booster dose, is recommended at 4 to 6 years of age, unless the fourth dose was given late (after the fourth birthday). Because immunity to diphtheria and pertussis wanes with time, adolescents (11 to 18 years old) should receive a booster dose of Tdap and later booster doses of Td (adult tetanus and diphtheria) every ten years.

**Contraindications**

**1) Who should NOT receive diphtheria vaccine?**

People who have had a serious allergic reaction to a dose of vaccine containing diphtheria toxoid should not receive another vaccination. Persons with a moderate or severe illness should postpone receiving the vaccine until their condition has improved.