

# Diphtheria rev Apr 2015

## BASIC EPIDEMIOLOGY

### Infectious Agent

Toxin-producing strains of *Corynebacterium diphtheriae*

### Transmission

Direct person-to-person transmission by intimate respiratory and physical contact. Cutaneous skin lesions are also important in transmission.

### Incubation Period

Usually 2-5 days (range 1-10 days)

### Communicability

Untreated individuals generally shed bacteria from the respiratory tract or from skin lesions for 2-4 weeks after infection. Infected individuals are infectious for up to 4 days after antibiotic treatment has been initiated. A chronic carrier state is extremely rare, but known to exist, and such a carrier may shed organisms for up to 6 months or longer.

### Clinical Illness

Classic diphtheria is an upper respiratory tract illness characterized by sore throat, low-grade fever, and an adherent membrane of the tonsils, pharynx, and/or nose. The disease can involve almost any mucous membrane. Growth of the adherent membrane can cause a potentially fatal airway obstruction. Patients with severe disease can develop a “bullneck” appearance caused by edema of the anterior neck.

Cutaneous diphtheria is either caused by toxigenic or non-toxigenic strains of *C. diphtheriae*. The disease is usually mild, typically consisting of non-distinctive sores or shallow ulcers, and rarely causes toxic complications. Cutaneous infections represent 1-2% of infections with toxigenic strains. Cutaneous diphtheria is not reportable, but should be promptly investigated to determine whether the strain is toxigenic.

## DEFINITIONS

### Clinical Case Definition

An upper respiratory tract illness typically characterized by sore throat, low-grade fever, and an adherent membrane of the tonsil(s), pharynx, larynx, and/or nose

### Laboratory Confirmation

- Isolation of *Corynebacterium diphtheriae* from a clinical specimen, or
- Histopathologic diagnosis of diphtheria.

### Case Classifications

- **Confirmed:** A clinically compatible case that is laboratory confirmed or is epidemiologically linked to a laboratory-confirmed case
- **Probable:** No probable case definition

**Note:** Cutaneous diphtheria should not be reported. All diphtheria isolates regardless of association with disease, should be sent to the DSHS Laboratory.

## SURVEILLANCE AND CASE INVESTIGATION

### Case Investigation

Local and regional health departments should immediately investigate any reported suspect cases of diphtheria

**\*\*If a provider suspects diphtheria, the provider should be instructed to call the Centers for Disease Control and Prevention (CDC) to obtain anti-toxin immediately. During business hours, the provider should call 404-639-3158, after hours the number is 404-639-7100.\*\***

Notify EAIDB immediately of the situation and the outcome of the call with the CDC. If the CDC releases anti-toxin, the following control measures should be implemented immediately. If the CDC does not feel anti-toxin is warranted, the control measures can be implemented after laboratory/pathological confirmation.

### Case Investigation Checklist

- If not done already, notify DSHS EAIDB immediately.
- If not done already, refer provider to CDC for anti-toxin.
- Isolate patient.
- Confirm that laboratory results meet the case definition.
- Verify that the laboratory has forwarded the specimen to the DSHS laboratory. See Laboratory Procedures.
- Review medical records or speak to an infection preventionist or physician to verify case definition, underlying health conditions, course of illness, vaccination status and travel history.
  - Request copies of admission and discharge summaries and laboratory results.
- Determine vaccination status of the case. Sources of vaccination status that should be checked include:
  - Case (or parent), ImmTrac, school nurse records, primary care provider, etc.
- Identify and follow-up with all close contacts. See Managing Close Contacts below.
  - Collect specimens and send to the DSHS laboratory.
  - Provide prophylaxis.
  - Monitor for 7 days.
  - Give vaccination or booster as appropriate for age and vaccination status.
- Submit specimens from case and close contacts to the DSHS laboratory.
- All confirmed case investigations must be entered and submitted for notification in the NEDSS Base System (NBS). Please refer to the *NBS Data Entry Guidelines* for disease specific entry rules.

### Control Measures

- Reports of suspected diphtheria should be investigated **immediately**.
- Universal vaccination with a diphtheria toxoid containing vaccine is the best prevention and control measure.
- Identify and follow-up with close contacts of confirmed cases.
  - Only close contacts of a patient with culture-confirmed or suspected diphtheria should be considered at increased risk for acquiring secondary disease. Such contacts include all household members and other persons with a history of habitual close contact with the patient, as well as those directly exposed to oral secretions of the patient.
- Patient should be kept in strict isolation until two cultures from both throat and nose, taken at least 24 hours apart and at least 24 hours after cessation of antimicrobial therapy, are negative for diphtheria bacilli. If cultures are not possible, patient should be kept in isolation for 14 days following appropriate antibiotic treatment.
- Cases should be monitored until hospital discharge, even if all investigation and control measures have been completed.

### Managing Close Contacts

- Close contacts should be cultured, receive prompt antimicrobial chemoprophylaxis, and be examined daily for seven days for evidence of disease.
  - Submit specimens from close contacts to the DSHS laboratory.
  - Do not wait for culture results before treating contacts.
- Recommended prophylaxis is a 7-10 day course of oral erythromycin (children 40 mg/kg/day and adults 1 g/day).
- Identified carriers of *C. diphtheriae* should be cultured after they complete antimicrobial therapy. Those who continue to carry the organism should receive an additional 10-day course of oral erythromycin and follow-up cultures.
- All close contacts who have received fewer than 3 doses of diphtheria toxoid or whose vaccination status is unknown should receive an immediate dose of a diphtheria toxoid-containing preparation appropriate for their age and should complete the primary series according to the recommended schedule.
- Close contacts who have completed a primary series of 3 or more doses of diphtheria toxoid and who have not been vaccinated with diphtheria toxoid within the previous 5 years should receive a booster dose appropriate for their age. See Managing Contacts flowchart.

### Treatment

The mainstay of treatment of a case of suspected diphtheria is prompt administration of diphtheria antitoxin. This should be given without waiting for laboratory confirmation of a diagnosis. Antitoxin is only available from the CDC, usually through the Quarantine Station in Houston. The provider should contact the CDC at 404-639-3158 or 404-639-7100 (after hours).

### Exclusion

Patient should be excluded until released from isolation by provider.

## REPORTING AND DATA ENTRY REQUIREMENTS

### Provider, School, Child-Care Facility, and General Public Reporting Requirements

Clinically suspected diphtheria cases are required to be reported **immediately** to the local or regional health department or to DSHS EAIDB at **(800) 252-8239** or **(512) 776-7676**.

### Local and Regional Reporting and Follow-up Responsibilities

Local and regional health departments should:

- Call DSHS EAIDB immediately when a diphtheria investigation is being done or considered.
- Enter the case into NBS and submit an NBS notification on all **confirmed** cases to DSHS within 30 days of receiving a report of a confirmed case.
  - Please refer to the *NBS Data Entry Guidelines* for disease-specific entry rules.
  - A notification can be sent as soon as the case criteria have been met. Additional information from the investigation may be entered upon completing the investigation.
- Cases should be monitored until hospital discharge, even if all investigation and control measures have been completed.
- Fax (or mail) a detailed written report, hospital records and laboratory reports within 30 days of completing the investigation.
  - **In the event of a death, copies of the hospital discharge summary, death certificate, and autopsy report should also be sent to DSHS EAIDB.**
  - Investigation forms may be faxed to **512-776-7616** or mailed to:  
Infectious Disease Control Unit  
Texas Department of State Health Services  
Mail Code: 1960  
PO Box 149347  
Austin, TX 78714-9347

## LABORATORY PROCEDURES

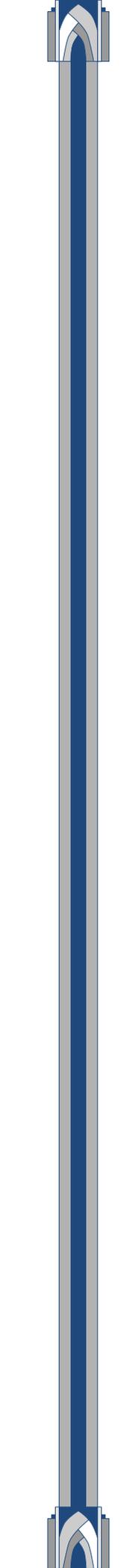
Isolation and identification of *Corynebacterium diphtheriae* is available through the DSHS Laboratory. Specimens should be sent to DSHS from cases and all close contacts. Before shipping specimens, be sure to notify DSHS EAIDB VPD staff at **(512) 776-7676**.

### Specimen Collection

- Use a cotton-tipped or polyester-tipped swab.
- Swabs should be taken below the membrane, if possible. (A portion of the membrane may be submitted for culture, but does not always yield *C. diphtheriae* well.)
- Ship swabs in Amie's or Stuarts Transport or transfer to a Loeffler's Slant for transport to DSHS Labs.

### Submission Form

- Use DSHS Laboratory G-2B form for specimen submission.
- Make sure the patient's name and date of birth or social security number match exactly what is written on the transport tubes.
- Fill in the date of collection, date of onset, and diagnosis/symptoms.



### **Specimen Shipping**

- Transport temperature: Keep at 2° - 25° C.
- Ship specimens via overnight delivery on cold packs or wet ice (double bagged) within 48 hours of collection.
- DO NOT mail on a Friday or a day before a state holiday unless special arrangements have been pre-arranged with DSHS Laboratory.
- Ship specimens to:

Laboratory Services Section, MC-1947  
Texas Department of State Health Services  
Attn. Walter Douglass (512) 776-7569  
1100 West 49th Street  
Austin, TX 78756-3199

### **Causes for Rejection:**

- Incorrect source of specimen
- Specimen > 24 hours not in transport medium
- Missing or discrepant information on form/specimen

# FLOW CHARTS

## Managing Contacts of Confirmed Diphtheria Cases

