DIPHTHERIA FACT SHEET

Agent: Caused by the bacterium, *Corynebacterium diphtheriae*.

Brief Description: In the United States, diphtheria is an uncommon infection of the upper respiratory tract. Initial symptoms of illness include a sore throat and low-grade fever. Nasopharyngitis due to diphtheria commonly presents with patches of adherent, grayish membrane with a surrounding dull red inflammatory zone on the tonsils, soft palate, uvula, and/or back of the pharynx. In severe disease, obstruction of the respiratory tract develops due to extensive membrane formation and there may be marked tenderness and swelling of the neck (Bull Neck). Late effects of diphtheria may include myocarditis and motor and sensory nerve palsy. Most clinical characteristics are caused by the release of a cytotoxin by the bacteria. Asymptomatic nasopharygeal infection (carriage) occurs in the general population despite vaccination. In the United States, severe diphtheria infection has been documented to occur more frequently in American Indian and homeless populations.

Reservoir: Humans.

Mode of Transmission: Transmission is most often person-to-person spread from
the respiratory tract of a patient or carrier. Rarely, transmission may occur from skin lesions or articles soiled with discharges from lesions of infected persons.

Incubation Period: Usually 2 to 5 days, occasionally longer.

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

Lab Criteria for Diagnosis:

- Isolation of toxin producing *Corynebacterium diphtheriae* from a nasopharyngeal specimen (preferably a culture of membrane tissue or a swab of tissue underlying the membrane) or
- PCR positive for *Corynebacterium diphtheriae* toxin by the CDC Diphtheria Laboratory.

Diagnostic Testing:

A. Culture (THE LABORATORY MUST BE INFORMED THAT YOU SUSPECT DIPTHERIA. A SPECIAL MEDIUM IS REQUIRED FOR ISOLATION OF THIS ORGANISM.)

1. Specimen: Throat or nasopharyngeal swab.
2. Outfits: Culture referral outfit, order #0505, and Loeffler's slant outfit, order #0560.
3. Lab Form: Culture referral form 3410 and Loeffler's slant form 3415.
4. Lab Test Performed: Isolation and identification of organism, toxigenicity testing.
5. Lab: State Bacteriology Laboratory (A REFERENCE LABORATORY IS NEEDED).
6. Transport requirements: If the duration of transport is < 24hrs, use Amies medium, if duration >= 24 hrs, use silica gel sachets. Isolates will be subcultured on Loeffler, Pai egg, or cystine blood agar slants. Toxigenicity testing will be performed at CDC. Send suspected isolates in culture referral outfit (#0505).

B. Polymerase Chain Reaction (PCR)

1. Specimen: Throat or nasopharyngeal swab.
2. Outfits: Culture referral outfit, order #0505, and Loeffler's slant outfit, order #0560.

3. Lab Form: Culture referral form 3410 and Loeffler's slant form 3415.
4. Lab Test Performed: PCR.
5. Lab: CDC Diphtheria Lab – alert lab when Diptheria is suspected, so that a specific PCR assay will be used.
6. Transport requirements: silica gel sachet, or a sterile dry container at 4 degrees Celsius.

Case Classification:

- ***Suspect:*** Sore throat, low-grade fever, and an adherent membrane on the tonsils or pharynx.
- ***Probable:*** A clinically compatible case that is not laboratory confirmed and is epidemiologically linked to a laboratory-confirmed case.
- ***Confirmed***: A clinically compatible case that is laboratory confirmed.
- ***Carrier:*** An asymptomatic person with laboratory confirmed *C. diphtheria* isolated from the nasopharynx.

Comment: *C. diphtheria* from non-respiratory sources (e.g. cutaneous, vaginal, otic) should not be reported. All toxin-producing *C. diphtheria* respiratory isolates, regardless of association with disease, should be sent to the Diphtheria Laboratory, National Center for Infectious Diseases, CDC.

Period of Communicability: Variable, until virulent bacilli have disappeared from discharges and lesions; shedding is usually 2 weeks or less, and seldom more than 4 weeks. Effective antibiotic therapy promptly terminates shedding within 4 days. Chronic carriers are rare but may shed organisms for 6 months or more.

Vaccination: Primary diphtheria immunization with diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP) is recommended for all persons at least 6 weeks old but < 7 years of age and without a history of contraindications. DTaP is the preferred vaccine for all doses in the vaccination series (including completion of the series in children who have received one or more doses of whole-cell DTP). The primary vaccination with DTaP series consists of a three-dose series, administered at ages 2, 4, and 6 months, with a minimum interval of 4 weeks between the first three doses. The fourth dose (first booster) is recommended at 15-18 months of age to maintain adequate immunity during preschool years. The fifth dose (second booster) is recommended for children aged 4-6 years to confer continued protection against disease during the early years of schooling. Routine tetanus booster immunization as Td, the adult formulation of tetanus and diphtheria toxoids, is recommended for all persons ≥ 7 years of age every 10 years.

Treatment: Diphtheria antitoxin (of equine origin) should be given when diphtheria is suspected, without waiting for laboratory confirmation. Detailed recommendations can be obtained from the Georgia Division of Public Health and CDC. Antitoxin is only available for treatment of clinical cases through CDC. The responsible health-care provider should contact the State Epidemiologist at (404) 657-2588, 24 hours a day, to request antitoxin, obtain authorization for its release and make arrangements for transport.

Antimicrobial therapy is also required to eradicate the organism and prevent spread, but **it is not a substitute for antitoxin** in clinical cases of diphtheria**.** Either erythromycin or penicillin is recommended to be administered for a 14-day treatment course.

Post-Exposure Prophylaxis: A single dose of benzathine penicillin or a 7-10 day course of erythromycin is recommended for all persons with household exposure to diphtheria, regardless of their immunization status.

Investigation: Guidelines for investigating a suspected case and for managing contacts are published and are referenced below.[5] Management of close contacts of suspected cases should include screening for possible respiratory or cutaneous diphtheria, obtaining nasopharyngeal cultures for *C. diphtheriae*, administering prophylactic antibiotics, treatment and follow-up of carriers, assessing diphtheria vaccination status, and administering any necessary vaccinations. The CDC Diphtheria Worksheet may be used for guidelines in conducting a case investigation.

Reporting: Report all suspect, probable, and confirmed cases **IMMEDIATELY** by phone to the local health department, District Health Office, or the Epidemiology Branch at 404-657-2588. If calling after regular business hours, it is very important to report cases to the Epidemiology Branch answering service. After a verbal report has been made, please transmit the case information electronically through the State Electronic Notifiable Disease Surveillance System (SENDSS) at http://sendss.state.ga.us, or complete and mail a GA Notifiable Disease Report Form (#3095).

Reported Cases of Diphtheria in Georgia, 1993-1999

Year	Number of Cases
1993	0
1994	0
1995	0
1996	0
1997	0
1998	0
1999	0

References:

1. The American Academy of Pediatrics. Diphtheria. Red Book 2000: Report of the Committee on Infectious Disease. Peter G., and Pickering, L. 25th Edition, 2000, 230-234.
2. Centers for Disease Control and Prevention. Manual for the surveillance of vaccine-preventable disease. Centers for Disease Control and Prevention: Atlanta, GA, 1999.
3. Chin J, ed. Diptheria. In: Control of Com municable Diseases Manual. 17th Ed. Washington, DC: American Public Health Association, 2000: pp. 165-170
4. Farizo KM, Strebel PM, Chen RT, et al. Fatal respiratory disease due to *Corynebac terium diphtheriae:* Case report and review of guidelines for management, investigation, and control. Clin Infect Dis 1993; 16:59-68.

Links:

- CDC Diphtheria Fact Sheet – http://www.cdc.gov/nip/publications/pink/dip.pdf
- CDC National Immunization Program – http://www.cdc.gov/nip/
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