Washington State Department of HEALTH

Diphtheria

Signs and Symptoms	Diphtheria can affect almost any mucous membrane. The most common clinical forms include: • **Pharyngeal/Tonsillar**: Most common. Malaise, sore throat, anorexia, and low-grade fever. Pharyngeal small patches of exudate in early disease progress to form a bluish-white pseudomembrane. This membrane becomes thick, firmly adherent, and bleeds if removal is attempted. Enlargement and tenderness of the anterior cervical lymph nodes is common. • **Laryngeal**: Fever, hoarseness, dyspnea, stridor, and a barking cough. It may occur as an extension of the pharyngeal form, or as laryngeal involvement alone. Fatal airway obstruction may occur. • **Anterior nasal**: Rare. Nasal mucopurulent and/or bloody discharge, white pseudo-membrane in nasal septum. • **Cutaneous**: Mild, non-distinctive sores or shallow ulcers. It may present as a scaling rash or as clearly demarcated ulcers. Rarely causes toxic complications. *Complications: pneumonia, myocarditis, neuritis, airway obstruction, septic arthritis, osteomyelitis, and death. The severity of symptoms correlates with the location and extent of the membrane.*	
Incubation	Varies from 1 to 10 days, usually 2-5 days.	
Case classification	**Clinical definition:** Upper respiratory illness characterized by sore throat, low grade fever, and an adherent pseudo-membrane on the tonsil(s), pharynx, and/or nose.	
	Confirmed case: meets clinical definition **AND** Laboratory confirmed **OR** epi linked to a confirmed case	**Probable case:** meets clinical definition, **AND** absence of laboratory confirmation, **AND** not linked to a confirmed case
Differential diagnosis	Streptococcal pharyngitis, viral pharyngitis, Vincent's angina, infectious mononucleosis, oral syphilis, acute epiglottitis, and oral candidiasis.	
Treatment	The mainstay of treatment is administration of Diphtheria Antitoxin (DAT), available at CDC quarantine stations. Antimicrobial therapy (erythromycin or penicillin) is also necessary to stop toxin production.	
Laboratory	**Culture:** Clinical specimens for isolation and identification of *C. diphtheriae.* PHL performs this test. **Identification:** *C. diphtheriae* isolates can be confirmed using traditional biochemical methods at PHL. **Serology:** Serum antibody levels less than 0.01 IU/ml are considered non-protective. PHL **does not** perform this test. *All C. diphtheriae isolates, regardless of association with disease, should be sent to PHL. They will be submitted to CDC where testing for the presence of the toxin-producing gene will be done. The presence of tox gene does not necessarily indicate that toxin is being produced. (See Section 4.A.)*	
Public Health investigation	• Assess the likelihood of diphtheria: confirm compatible clinical symptoms, verify vaccination and travel history, and assess exposure risk such as contact with a person with diphtheria or recent visit(s) to a health care facility. • Recommend immediate isolation of case (droplet precautions) until diphtheria is ruled out, or 2 cultures taken at least 24 h apart and 24 h after antimicrobial therapy cessation are negative. • Consult with DOH CD Epi regarding the need for DAT, and specimen collection for confirmatory/toxigenicity testing. • Recommend appropriate infection control precautions to prevent additional exposures in healthcare facilities, schools, and other public settings. • Identify close contacts and determine their immune status. Close contacts of a confirmed case should have cultures taken from nose and throat regardless immunization status or the presence of symptoms, and they should receive antimicrobial therapy. • Recommend vaccination for all cases during the convalescence period (disease does not always confer immunity), and for any close contact whose last dose was received more than 5 years ago.	

Diphtheria

1. DISEASE REPORTING

A. Purposes of Reporting and Surveillance

1. To assist in the identification of cases.
2. To assure early and appropriate treatment with diphtheria antitoxin and antibiotics along with isolation to prevent transmission if needed.
3. To identify and evaluate contacts and recommend appropriate antibiotic prophylaxis and/or immunization to prevent further spread of the disease.
4. To alert public health authorities and health care providers to the presence of diphtheria in the community and the potential for additional infections, a particular concern given the large number of susceptible adults.

B. Legal Reporting Requirements

1. Health care providers and Health care facilities: *immediately* notifiable to **local health jurisdiction.**
2. Laboratories: *immediately* notifiable to **local health jurisdiction**; submission required – isolate within 2 business days; submission on request – specimen associated with positive result, within 2 business days.
3. Local health jurisdictions: **immediately notifiable to the Washington State Department of Health (DOH) Office of Communicable Disease Epidemiology (CDE) at 877-539-4344 or 206-415-5500.**

C. Local Health Jurisdiction Investigation Responsibilities

1. Begin case investigation immediately. If the health care provider requests antitoxin contact CDE to facilitate release of the biologic.
2. Facilitate the transport of specimens to assist with the diagnosis.
3. Recommend measures to prevent further spread from the case.
4. Identify and evaluate contacts; educate and recommend measures to prevent further spread from contacts.
5. Report all *confirmed* and *probable* cases (see Section 3C) to CDE. Complete the diphtheria case report form (http://www.doh.wa.gov/Portals/1/Documents/5100/210-056-ReportForm-Diphtheria.pdf) and enter the data into the Washington Disease Reporting System (WDRS).

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Diphtheria is caused by toxigenic strains of the bacteria *Corynebacterium diphtheriae*, a gram-positive bacillus which is resistant to environmental changes, including freezing and drying. Exotoxin production occurs when the bacteria are infected by a bacteriophage (a specific virus) that contains a gene that encodes for the toxin (tox gene). Only

toxigenic strains cause severe disease. (Rarely a diphtheria-like illness is caused by a toxigenic strain of *C. ulcerans* or *C. pseudotuberculosis* and it has been shown that nontoxigenic strains can be converted to toxigenic strains by infection with the bacteriophage). *C. diphtheriae* has four biovars: gravis, intermedius, mitis, and belfanti, any of which may be toxigenic. Therefore, all clinical isolates of *C. diphtheriae* should be tested for toxigenicity. Nontoxigenic strains can cause sore throat and other invasive infections, and have been increasingly associated with endocarditis.

B. Description of Illness

Classic diphtheria is an upper-respiratory tract illness characterized by sore throat, low-grade fever, and the production of a toxin that causes local cellular destruction of mucous membranes. The accumulated debris and fibrin results in the characteristic adherent "pseudomembrane" which usually involves the tonsil(s), pharynx, and/or nose; however, the disease can involve almost any mucous membrane. Absorbed toxin can cause other manifestations in various organs, including the myocardium, kidneys, and nervous system.

For clinical purposes, diphtheria can be classified according to the site of the infection:

1. Pharyngeal and tonsillar diphtheria (faucial)

Pharyngeal and tonsillar diphtheria is the most common type of infection (about 70% of cases). It initially presents with an insidious onset of malaise, sore throat, anorexia, and low-grade fever (usually under 102 F). At onset of symptoms, the pharynx is erythematous but no membrane is present. About a day after onset, small patches of exudate appear in the pharynx. Despite the low grade fever, patients usually appear quite ill and have tachycardia ("toxic appearance"). Within 2 or 3 days of onset, the patches of exudate spread and become confluent and may form a bluish-white pseudomembrane that can extend to the entire pharynx, including the nasopharynx, tonsillar areas, soft palate, and uvula. This membrane becomes grayish, thick, firmly adherent, and may have patches of green or black necrosis. Attempts to remove the pseudomembrane cause bleeding.

Enlargement and tenderness of the anterior cervical lymph nodes is common. With severe disease patients can develop edema of the soft tissues in the anterior neck, giving a characteristic "bullneck" appearance, which can cause respiratory stridor and is associated with a higher morbidity and mortality.

The severity of symptoms correlates with the location and extent of the membrane. In untreated patients, the membrane begins to soften about a week after onset and gradually detaches, usually in pieces. As the membrane detaches, acute systemic symptoms disappear. However, at any point during the course of the illness, if a significant amount of toxin is absorbed into the blood stream, patients may develop pallor and a rapid pulse which can progress to coma and even death.

2. Laryngeal diphtheria

Laryngeal diphtheria occurs in about 25% of cases, and is more likely to occur in children younger than 4 years. When the infection involves the larynx, it may occur either as an extension of the pharyngeal form, or as laryngeal involvement alone. Patients can present with fever, hoarseness, dyspnea, respiratory stridor, and a barking cough. In this form, also, the pseudomembrane can cause potentially fatal

airway obstruction and a greater degree of toxin absorption if the membrane is extensive.

3. Laryngeal diphtheria

Anterior nasal diphtheria usually presents with mucopurulent discharge from the nose, which may be bloody, and is often associated with a white pseudomembrane on the septum. External nares and upper lip may also be involved. Anterior nasal diphtheria as the only manifestation is uncommon (about 2% of cases).

The differential diagnosis of respiratory diphtheria (i.e. pharyngeal, laryngeal, anterior nasal) includes infection with other pathogens that can cause similar symptoms including: other corynebacteria species, Arcanobacterium haemolyticum, as well as Streptococcus spp., Epstein-Barr virus and cytomegalovirus (both of which cause infectious mononucleosis syndrome). Candida albicans, syphilis, bacterial anaerobes (such as the organisms associated with Vincent's angina), and some viruses may cause a membrane of the throat and tonsils.

4. Cutaneous (skin) diphtheria

Cutaneous diphtheria, which can be caused by toxigenic or nontoxigenic strains of *C. diphtheriae*, is usually mild, typically consisting of nondistinctive sores or shallow ulcers. Cutaneous infections represent 1%–2% infections with toxigenic strains and rarely cause toxic complications. The disease may present as a scaling rash or as clearly demarcated ulcers but any chronic skin lesion may harbor *C. diphtheriae* along with other organisms (including *Staphylococcus aureus* and group A streptococci). Cutaneous diphtheria lesions may act as a reservoir for *C. diphtheriae* and a source of respiratory infection.

Skin infections with *C. diphtheriae* are common in tropical climates, and this is likely the reason for high levels of natural immunity seen among local populations in these regions. It is also more common in environments of poverty, poor hygiene, and overcrowding. Since 1980, cutaneous diphtheria has not been a nationally reportable disease. Nevertheless, all *C. diphtheriae* isolates should be submitted for testing to determine whether the tox gene is present.

Other possible sites of infection include the conjunctiva, vulvovaginal area, and external auditory canal. Severe disease is more likely to occur in people who are unimmunized or under immunized. Fully immunized people may be asymptomatic carriers or experience a mild sore throat.

Complications of diphtheria include pneumonia, myocarditis, neuritis, airway obstruction, septic arthritis, osteomyelitis, and death. The case-fatality rate for classic diphtheria is approximately 10%.

C. Diphtheria in the United States and Washington State

Diphtheria is rare in the United States. Between 1980 and 2013, 56 cases of diphtheria have been reported. Only 1 of these cases was reported in the last decade. The majority of cases were in persons 15 years of age and older, and 4 of 5 fatal cases were in unvaccinated children. The fifth fatal case was in an adult traveler returning in 2003 from a country where the disease is endemic. Cutaneous diphtheria due to nontoxigenic strains is still known to occur in the United States, particularly among homeless persons.

The last major outbreaks in the United States occurred in Seattle, Washington. There were three outbreaks of cutaneous diphtheria in Seattle from 1972 through 1982. The first was due to a toxigenic strain while the later outbreaks were due to nontoxigenic strains. The last case of toxigenic diphtheria reported in Washington occurred in 1979. Since diphtheria is no longer endemic in Washington, if a case occurs now it would likely be travel-associated.

D. Reservoir

Infected humans are the reservoir.

E. Modes of Transmission

Diphtheria is transmitted from person to person through respiratory droplets or, less commonly, through contact with discharge from skin lesions. Historically, raw milk[*†] and fomites, such as soiled linens, were known to have served as vehicles of transmission.

*Porter AE. An outbreak of diphtheria due to infected milk. British Medical Journal. 1922;2(3228):906-907.
†Chase HL. A Diphtheria Outbreak Believed to be due to Infected Milk. Journal Massachusetts Association of Boards of Health. 1900;10(1):5-20.

F. Incubation Period

The incubation period is usually 2–5 days (range 1–10 days).

G. Period of Communicability

Once infected, untreated persons can shed bacteria from the respiratory tract or from skin lesions for 2–6 weeks. Once treatment with an effective antibiotic has been initiated, persons are communicable for up to 4 days. However, isolation should be maintained until two cultures have shown an absence of the organism (See Section 6.A.3). A chronic carrier state is known to exist, but it is rare. Such a carrier may shed organisms for 6 months or more, but effective antibiotic therapy promptly eliminates shedding.

H. Treatment

The mainstay of treatment for diphtheria is prompt administration of diphtheria antitoxin (DAT). If toxigenic diphtheria is strongly suspected on the basis of clinical findings, specimens for bacteriologic testing should be collected, then antitoxin given as soon as possible, without waiting for test results.

CDC maintains a supply of DAT at quarantine stations around the country, including the one located at SeaTac airport. DAT is currently available for treatment of respiratory diphtheria under an FDA-approved Investigational New Drug (IND) protocol. Since the antitoxin is of equine origin, a test to rule out hypersensitivity should be performed before administration. Antitoxin may only be administered in an inpatient environment.

Healthcare providers of a patient with suspected diphtheria should contact their local health jurisdiction immediately. The local health jurisdiction in collaboration with DOH will arrange a consultation with CDC, and subsequent transport of antitoxin if needed. For additional information regarding DAT, see:
http://www.cdc.gov/diphtheria/dat.html

Although antitoxin remains the primary therapy, antimicrobial therapy is necessary to stop toxin production, to eradicate *C. diphtheriae,* and to prevent further spread.

Therefore, patients should also be treated with one of the following:

- Erythromycin (given orally or parenterally) for 14 days,
- Penicillin G (intramuscularly or intravenously) for 14 days, or
- Procaine penicillin G intramuscularly for 14 days.

Appropriate droplet precautions should remain in place until diphtheria is ruled out or until 2 cultures taken after completion of antimicrobial therapy, and 24 hours apart, are negative (See Section 6.A.3).

I. Immunity

Immunization with diphtheria toxoid produces prolonged but not necessarily lifelong immunity (See Section 8.A for current immunization recommendations). Lifelong immunity is usually, but not always, acquired after disease or inapparent infection.

Using serum obtained from over 18,000 participants of the Third National Health and Nutrition Examination Survey (NHANES), a serosurvey‡ showed that overall, 60.5% of persons over the age of 6 had fully protective levels (≥0.10 IU/ml) of diphtheria antibodies. Differences between males and females, and by age groups were observed. The proportion of persons with adequate protection decreased with increasing age, and was only 30-40% among persons over 60 years of age. The proportion of fully protected females was lower in all age groups when compared to men.

‡McQuillan GM, Kruszon-Moran D, Deforest A, Chu SY, Wharton M. Serologic Immunity to Diphtheria and Tetanus in the United States. Ann Intern Med. 2002;136:660-666.

3. CASE AND CONTACT DEFINITIONS

A. Clinical description

Classic diphtheria is an upper-respiratory tract illness characterized by sore throat, low-grade fever, and an adherent pseudomembrane on the tonsil(s), pharynx, and/or nose. However, disease can involve almost any mucous membrane. For clinical purposes it is convenient to classify diphtheria depending on the site of disease:

- anterior nasal diphtheria
- pharyngeal and tonsillar diphtheria
- laryngeal diphtheria
- cutaneous (skin) diphtheria

B. Laboratory criteria for diagnosis

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

C. Case classification (2010)

1. *Probable*: in the absence of a more likely diagnosis, an upper respiratory tract illness with:
   - An adherent membrane of the nose, pharynx, tonsils, or larynx; **AND**
   - Absence of laboratory confirmation; **AND**
   - Lack of epidemiologic linkage to a laboratory-confirmed case of diphtheria.

2. *Confirmed*: an upper respiratory tract illness with an adherent membrane of the nose, pharynx, tonsils, or larynx; and any of the following:
    - Isolation of *Corynebacterium diphtheriae* from the nose or throat; **OR**
    - Histopathologic diagnosis of diphtheria; **OR**
    - Epidemiologic linkage to a laboratory-confirmed case of diphtheria.

D. Comment

All respiratory disease caused by *C. diphtheriae* (whether toxigenic or nontoxigenic) should be reported as diphtheria. Although cutaneous diphtheria is not reportable, all *C. diphtheriae* isolates, regardless of association with disease, should be submitted to the Washington State Public Health Laboratories (PHL) for submission to the Diphtheria Laboratory at CDC.

Rarely, respiratory diphtheria may result from infection with other *Corynebacterium* species (*C. ulcerans* or *C. pseudotuberculosis*). These bacteria, if isolated, should also be forwarded to PHL for submission to CDC.

4. DIAGNOSIS AND LABORATORY SERVICES

A. Diagnosis

The initial diagnosis of diphtheria should be based on the clinical presentation because it is imperative to begin presumptive therapy quickly.

Culture and toxigenicity testing: Diphtheria is confirmed by isolation of *Corynebacterium diphtheriae* followed by toxigenicity testing. When diphtheria is suspected, the clinical laboratory receiving specimens for testing should be advised so that culture medium that provides a selective advantage for the growth of *C. diphtheria* can be used if available. A blood agar plate can be inoculated if medium containing tellurite is not available. If the health care provider and submitting laboratory are requesting that isolation be attempted at PHL, specimens should be transported on Amies transport medium with charcoal.

When diphtheria bacilli are isolated they **must** be tested for the presence of the toxin-producing gene. A PCR assay is available at CDC to do this and PHL will forward all *C. diphtheriae* isolates. If the patient received antibiotics prior to specimen collection and no diphtheria isolate can be obtained a clinical specimen can be tested directly for the presence of the tox gene at CDC using PCR.

The presence of the tox gene does not necessarily indicate that toxin is being produced. If the patient is receiving DAT, CDC will perform additional testing to verify toxin expression using the ELEK test.

Serologic testing: Serum antibody levels can assist with assessing the likelihood of the diagnosis whenever diphtheria is suspected. Specimens MUST be collected prior to the administration of DAT. When antibiotics were administered prior to collection of specimens for culture, health care providers should be strongly encouraged to obtain a serum specimen.

- Serum antibody levels less than 0.01 IU/ml – likely susceptible to diphtheria
- Serum antibody levels between 0.01–0.09 IU/ml – indicates basic immunity
- Serum antibody levels ≥0.10 IU/ml – considered fully protective.

Testing for serum antibody levels is available at commercial laboratories.

B. Tests Available at Washington State Public Health Laboratories (PHL)

PHL can isolate *C. diphtheriae* from clinical specimens (culture) or confirm an organism already isolated at a community laboratory as *C. diphtheria* (identification).

WA PHL no longer offers PAI medium as transportation medium. Amies with charcoal is readily available commercially and has been validated by PHL as an adequate diphtheria specimen transportation medium. **Neither PHL nor CDC performs serologic testing for diphtheria.**

All requests for diphtheria testing to be done at PHL or forwarded to CDC for testing must have approval from an CDE epidemiologist prior to specimen submission.

Note that PHL requires all clinical specimens have two patient identifiers, a name **and** a second identifier (e.g., date of birth) both on the specimen label and on the submission form. Due to laboratory accreditation standards, specimens will be rejected for testing if not properly identified. Also include specimen source and collection date.

C. Specimen Collection

Information on specimen collection and submission instructions for *C.diphtheriae* culture and identification can be found at PHL Microbiology testing menu:

https://www.doh.wa.gov/Portals/1/Documents/5240/SCSI-Ref-diph-Cx-V2.pdf *

https://www.doh.wa.gov/Portals/1/Documents/5240/SCSI-Ref-diph-ID-V2.pdf

**Please see Section 4.B. regarding Pai medium no longer being available.*

Culture specimens: Using respiratory precautions, health care providers should collect clinical specimens for culture from the nose and throat of all persons with suspected diphtheria (nasopharyngeal swab preferred). If possible, swabs should also be taken from beneath the adherent pseudomembrane, and a portion of the pseudomembrane collected in a sterile container. Specimens for culture should be obtained as soon as diphtheria (involving any site) is suspected, even if treatment with antibiotics has already begun.

Clinical specimens should reach the PHL as quickly as possible after collection.

If no diphtheria isolate can be obtained from a patient receiving DAT, a clinical specimen should be sent to PHL for direct testing at CDC for the presence of the tox gene using PCR. Respiratory specimens for PCR testing should be collected using a polyester, rayon, or nylon swab, placed in a dry sterile container, and transported at 4° C.

Collection of clinical specimens for isolation of *C. diphtheriae* from close contacts (potential carriers) of a highly suspected diphtheria case can also aid in the presumptive diagnosis.

Presumptive diphtheria isolates and clinical specimens should be submitted with a completed DOH microbiology form available at:
http://www.doh.wa.gov/Portals/1/Documents/5230/302-013-Micro.pdf

For additional information regarding laboratory testing for diphtheria, see:
http://www.cdc.gov/vaccines/pubs/surv-manual/chpt22-lab-support.pdf

5. ROUTINE CASE INVESTIGATION

A. Evaluate the Diagnosis

Review the clinical presentation, risk factors for exposure, and immunization status to determine the likelihood of the diagnosis.

If diphtheria is highly suspected, do the following:

- Assure that the patient is in respiratory isolation with droplet precautions.
- Immediately consult with CDE regarding the need for testing and treatment with diphtheria antitoxin. CDE will facilitate CDC consultation as needed.
- Request collection of specimens for confirmation of the diagnosis at PHL. Collect serum to be held for serologic testing, as needed.
- Recommend the initiation of antibiotic treatment. Treatment should not be delayed pending laboratory confirmation when the diagnosis of diphtheria is strongly suspected.
- Facilitate the transportation of specimens to PHL.

If the suspicion of diphtheria is low, specimens can be sent to a commercial laboratory, but the laboratory staff should be alerted that diphtheria is included in the differential diagnosis.

B. Identify Source of Infection

Ask the patient about potential sources of infection in the 10 days prior to onset including:

- Travel out of the country, especially to an area where diphtheria is still endemic;
- Contact with persons from a country where diphtheria is still endemic; and
- Working, visiting, or volunteering in a health care setting.

Please note: Using nose and throat cultures to search for diphtheria carriers, other than among close contacts, is not ordinarily useful or indicated.

C. Identify Close Contacts

Identify all close contacts, particularly household members and others who were directly exposed to respiratory secretions of the case, and determine their immunization status. See section 6.B. for managing contacts.

D. Environmental evaluation

None

6. CONTROLLING FURTHER SPREAD

A. Infection Control Recommendations/Case Management

1. Hospitalized patients with confirmed **pharyngeal diphtheria** should be cared for using **droplet** precautions until they have completed antimicrobial therapy and two cultures

taken at least 24 hours apart, and at least 24 hours after cessation of antimicrobial therapy, fail to show diphtheria organisms.

2. Hospitalized patients with **cutaneous diphtheria** should be cared for using **contact** precautions until they have completed antimicrobial therapy and two cultures taken at least 24 hours apart, and at least 24 hours after cessation of antimicrobial therapy, fail to show diphtheria organisms.
3. Persons with confirmed diphtheria should avoid close contact with others until two cultures taken 24 hours apart, and at least 24 hours after cessation of antimicrobial therapy, fail to show diphtheria organisms.
4. All articles soiled by respiratory or cutaneous discharges of a patient with diphtheria should be cleaned using contact precautions.
5. Persons with diphtheria should be vaccinated with diphtheria toxoid during convalescence since clinical disease does not necessarily confer immunity.

B. Contact Management

1. Close contacts with symptoms compatible with diphtheria should be referred to a health care provider for evaluation immediately.
2. All close contacts of a confirmed diphtheria case should have cultures taken from the nose **and** throat, regardless of their immunization status or whether symptoms are present.
3. After cultures have been collected, close contacts should receive a single dose of benzathine penicillin (IM- 600,000 units for persons less than 6 years of age and 1.2 million units for persons 6 years of age or older) **or** a 7–10 day course of oral erythromycin (40 mg/kg/d for children and 1 g/d for adults), regardless of their immunization status. Contacts found to have had positive cultures should have follow-up cultures done after completion of therapy to ensure that eradication of the organism has occurred.
4. Previously immunized close contacts should receive a booster dose of diphtheria toxoid if more than 5 years have elapsed since their last dose. Unimmunized contacts should initiate the primary series immediately. (See Section 8.A)
5. Close contacts should watch for symptoms of diphtheria during the period from the day after the first possible exposure through 10 days after the last known exposure. Daily symptom check by public health should be considered for contacts that were unimmunized when exposed.
6. Close contacts that handle food or who work with school children should be excluded from work or school until bacteriologic examination proves them not to be carriers. (Transmission of diphtheria through raw milk has been documented.)

   For additional information regarding case investigations, see the CDC VPD Surveillance Manual available at: http://www.cdc.gov/vaccines/pubs/surv-manual/chpt01-dip.html

C. Environmental measures

None

7. MANAGING SPECIAL SITUATIONS

Special situations will be handled on a case by case basis. Please consult with Office of Communicable Disease Epidemiology.

8. ROUTINE PREVENTION

A. Immunization Recommendations

1. Immunization with diphtheria toxoid in combination with tetanus toxoid and acellular pertussis vaccine is recommended for all children according to the table below as part of the routine schedule recommended by the Advisory Committee on Immunization Practices (ACIP).

If a child has a contraindication to the pertussis vaccine, pediatric DT should be used to complete the childhood vaccination series.

Table 1: Routine Schedule for Childhood Diphtheria Vaccination

Dose	Age	Minimal Interval
DTaP 1	2 months	N/A
DTaP 2	4 months	4 weeks
DTaP 3	6 months	4 weeks
DTaP 4	15–18 months	6 months
DTaP 5*	4–6 years	6 months
Tdap **	11-12 years	N/A

*Five DTaP doses are recommended. However, if the fourth dose is given on or after the fourth birthday, the child can be considered up to date.

** Adolescents aged 11 through 18 years who have completed the recommended childhood diphtheria and tetanus toxoids and pertussis vaccine (DTP/DTaP) vaccination series should receive a single dose of Tdap instead of tetanus and diphtheria toxoids (Td) vaccine, preferably at a preventive-care visit at age 11 or 12 years. For children 7 through 10 years who receive a dose of Tdap as part of the catch-up series, an adolescent Tdap vaccine dose at age 11 through 12 should NOT be administered.

The full routine childhood vaccination schedule and catch-up recommendations are available at: http://www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html

2. Persons aged ≥11 years who have not received Tdap vaccine or for whom vaccine status is unknown should receive a dose of Tdap followed by tetanus and diphtheria toxoids (Td) booster doses every 10 years thereafter.

   Administer 1 dose of Tdap vaccine to pregnant women during each pregnancy (preferably during 27–36 weeks' gestation) regardless of interval since prior Td or Tdap vaccination. The full routine adult vaccination schedule and catch-up recommendations are available at: http://www.cdc.gov/vaccines/schedules/hcp/adult.html

3. For additional information regarding use of the diphtheria vaccines, adverse reactions and contraindications see the most recent CDC Pink Book available at: http://www.cdc.gov/vaccines/pubs/pinkbook/dip.html

B. Prevention Recommendations

Immunization is the best way to prevent diphtheria.

ACKNOWLEDGEMENTS

This document is a revision of the Washington State Guidelines for Notifiable Condition Reporting and Surveillance published in 2002 which were originally based on the Control of Communicable Diseases Manual (CCDM), 17th Edition; James Chin, Ed. APHA 2000. We would like to acknowledge the Oregon Department of Human Services for developing the format and select content of this document.

UPDATES

January 2011:
The Legal Reporting Requirements section has been revised to reflect the 2011 Notifiable Conditions Rule revision.
Updated to include the 2010 CSTE case classification changes.

March 2016:
Clinical presentation and Epidemiology sections were reviewed and updated according to the most recent medical literature available.
Specimen collection section was updated to reflect current testing available at PHL and CDC.
Immunization section was updated for consistency with current ACIP recommendations.

December 2022:
For 2023 WAC revision combined provider and facility reporting requirement, updated laboratory submission (Section 1B)