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Centers for Disease Control

National Institutes of Health, Islamabad

Ministry of National Health Services, Regulations & Coordination

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National Focal Point for International Health Regulations

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**Subject: Urgent Actions required to prevent and control Diphtheria Transmission**

Considering the emerging situation of recent upsurge of diphtheria cases and associated mortality across various regions of the country and higher risk of transmissibility during the dry and cool season, it is of eminent importance that healthcare authorities should proactively implement prevention and control strategies in order to halt the ongoing transmission. Diphtheria is a reportable priority disease within the existing IDSRs. It has a standardized case definition to capture and report probable and confirmed cases from both public and private healthcare facilities, this is followed by prompt case investigation and public health action. This national advisory aims to inform healthcare authorities on the implementation of data-driven, evidence based targeted interventions to disrupt transmission. Actions include improving vaccine coverage, enhancing surveillance for early detection, reporting and response, ensuring proper case management, and promoting public health education and awareness. Timely and effective execution of these actions will play a significant role in safeguarding our communities.

Diphtheria is a highly contagious infectious disease caused by a toxin produced by *Corynebacterium diphtheriae*, disease can be prevented through vaccination. The toxin-mediated upper respiratory illness caused by the *C. diphtheriae* usually affects the throat and sometimes tonsils and can involve mucous membrane and skin. Disease can be classified based on the sites; anterior nasal, pharyngeal and tonsillar, laryngeal, cutaneous, ocular and genital. These classifications are important for manifestation, diagnosis and treatment of disease. Diphtheria forms pseudomembrane (thick covering) on throat. Diphtheria affects individuals of all ages, however unimmunized children under 5 years of age are most commonly affected. The case fatality rate varies from 5–17% among the unvaccinated. Early detection and accurate diagnosis (both clinical and lab), effective case management, utilizing diphtheria antitoxin (DAT) or recommended antibiotics, are crucial for saving lives.

**Mode of Transmission:** *C.diphtheriae* infection can be transmitted from person to person, usually through respiratory droplets (coughing or sneezing). Infection may come by touching open sores (skin lesions) and material objects (toys or clothes) used by the person who already is sick with diphtheria.

**Incubation period:** Usually 2 to 5 days.

**Period of Communicability:** Organisms usually persist 2 weeks or less and seldom more than 4 weeks. Chronic carriers may shed organisms for 6 months or more.

**Risk Groups:** Risk of diphtheria increased in un-immunized or partially immunized persons. People living in unhygienic and crowded places and situations (such as, schools, public transport, hotels, public gatherings, and Hospital OPDs) are more prone to be victimized. The risk factors includes living with positive case, being close together, sharing respiratory secretions (saliva, spit) and being exposed to wound or secretion without proper PPE.

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**Clinical Features:** Symptoms range from sore throat to toxic life-threatening diphtheria of the larynx or of the lower and upper respiratory tracts. Infected person may present with sore throat, low grade fever (rarely high), swollen glands (making breathing and swallowing difficult) and the toxins can lead to a thick coating an adherent greyish white pseudomembrane on the tonsils, pharynx or nasal cavity. This membrane is usually fuzzy gray or black, and can cause breathing problems and trouble swallowing. Systemic presentation is rare and may have myocarditis and polyneuritis. As the infection continues, someone may have trouble breathing or swallowing, complain of double vision, have slurred speech, and show signs of going into shock. The toxin, once absorbed, reaches other organs and can cause myocarditis, paralytic symptoms and nephritis. In non-vaccinated individuals, and especially if proper treatment is delayed, death can occur in up to 10% of clinical cases despite antibiotics and the use of anti-sera. The most common cause of death is suffocation by aspiration of the membrane.

**Probable Case:**

Any person who meets the clinical case definition for respiratory diphtheria i.e. upper respiratory tract illness characterized by laryngitis or pharyngitis or tonsillitis, and a visible adherent "membrane" on the tonsils, pharynx and/or nose and without epidemiological linkage and laboratory confirmation.

**Confirmed case:**

Any confirmed case is a probable case that has been laboratory confirmed or linked epidemiologically to a laboratory confirmed case. Persons with positive *C. Diphtheria* culture but asymptomatic, should not be reported as suspected or confirmed cases.

**Diagnosis:** Clinical suspicion is enough to start treatment. Specimens for culture should be obtained immediately as diphtheria (involving any site) is suspected, even if treatment with antibiotics has already begun. Collect nasopharyngeal and throat swabs by using polyester, rayon or nylon swabs for culture. The swabs should be placed in transport media such as Amies or Stuart and shipped overnight with ice packs. Pieces of pseudo-membrane may also be submitted in sterile saline (not formalin) in hospital settings and if shipped should be in ice packs. Collect 5 ml blood or serum (acute and convalescent phase) for serological diagnosis. Transport swabs and pieces of pseudo-membrane in Amies transport Medium and sterile saline, respectively, on ambient temperature.

**Case Management:**

- Treatment of diphtheria should be initiated even before confirmatory tests are completed due to the high potential for mortality and morbidity.
- Neutralize the toxin as soon as diphtheria is suspected. Diphtheria antitoxin neutralizes circulating toxin prior to its entry into the cells and prevents the progression of symptoms. The dose and route of administration (IV vs IM) are dependent on the severity of the disease. The patient must be tested for sensitivity to the antitoxin before it is given.
- Secure definite airway for patients with impending respiratory compromise or the presence of laryngeal membrane. Removal of membrane by direct laryngoscopy or bronchoscopy may be necessary to prevent or improve airway obstruction.
- Maintain close monitoring of cardiac activity for early detection of rhythm abnormalities.
- Erythromycin and penicillin are both recommended for the treatment of diphtheria. Initiate prompt antibiotic coverage for eradication of organisms, thus limiting the amount of toxin production. Antibiotics hasten recovery and prevent the spread of the disease to other individuals. Macrolide therapy has been associated with an increase in pyloric stenosis in children younger than 6 months, especially treatment with erythromycin.



- The patient should be isolated until three consecutive cultures at the completion of therapy have documented elimination of the organism from oropharynx.
- Diphtheria disease does not confer immunity; thus, initiation or completion of immunization with diphtheria toxoid is necessary.
- Throat cultures should be repeated in 2 weeks after treatment.

**For Contacts:**

All close contacts, regardless of vaccination status, should have nose and throat cultures, receive a single dose of Benzathine Penicillin I/M (600,000 units for children <6; 1.2 million units for 6 or older) or a 7-10 day course of Erythromycin (PO) and remain under surveillance for 7 days.

**Preventive Measures:**

- Standard precautions along with droplet precautions are recommended with single room isolation.
- Primary prevention of disease by ensuring high population immunity through immunization.
- Secondary prevention through rapid investigation of close contacts to ensure their early diagnosis and proper treatment.
- Tertiary prevention of complications and deaths by early diagnosis and proper management.
- Close contacts, such as family members, household contacts, and potential carriers, must receive chemoprophylaxis regardless of immunization status or age. This entails treatment with erythromycin or penicillin for 14 days and post treatment cultures to confirm eradication.

**Vaccination:**

- Routine immunization consists of 3 doses of 0.5 ml DPT-Hep-B-Hib (Pentavalent Vaccine) administered IM to all the children less than one year of age with the schedule of:
  - a. 1st dose at the age of 6 weeks;
  - b. 2<sup>nd</sup> at 10 weeks;
  - c. 3<sup>rd</sup> at 14 weeks, a booster DTP at 18 months to 4 years.
- If children or adults have not been immunized with three-dose series, children < 5 years should receive DT vaccine, and children ≥ 5 years and adults should receive Td vaccine to complete a series of three doses
- People, who are caring for diphtheria case should practice strict hygiene protocols, e.g. wash hands frequently, particularly before handling, preparing and eating food.
- During alerts the teenagers and adult should get a booster vaccination.
- All contacts with known case of diphtheria should also receive a course of antibiotics.

**Laboratory Diagnosis and NIH Support:**

- Lab tests for Diphtheria should be recommended to those who fulfill criteria of probable case definition discussed above in clinical features and also available at NIH website ([www.nih.org.pk](http://www.nih.org.pk)).
- NIH can provide support to confirm diphtheria infection in human from samples of throat swabs, via culture and Elek testing of isolates for diphtheria toxin production.
- Vaccination information/history, if any, is mandatory to be furnished at the time of testing for lab diagnostic.

**Key Recommendations:**

**1. Strengthen Vaccination Efforts:**

- Ensure that vaccination programs are fully operational, with a focus on reaching under-immunized populations.
- Increase awareness campaigns to inform communities about the importance of diphtheria vaccination, especially for children and high-risk groups.

**2. Enhance Surveillance:**

- Implement robust surveillance systems to monitor and report diphtheria cases promptly.
- Encourage healthcare providers to be vigilant in diagnosing and reporting suspected cases.

**3. Promote Public Awareness:**

- Launch public health campaigns to educate communities about the symptoms of diphtheria and the importance of seeking medical attention.
- Distribute informational materials in healthcare facilities and community centers.
- School children showing diphtheria symptoms should remain home until their symptoms resolve or they test negative.

**4. Establish Treatment Protocols:**

- Ensure that healthcare facilities are equipped with the necessary antitoxin and antibiotics for treating diphtheria.
- Train healthcare personnel on the early recognition and management of diphtheria cases.

**5. Strengthen Infection Control Measures:**

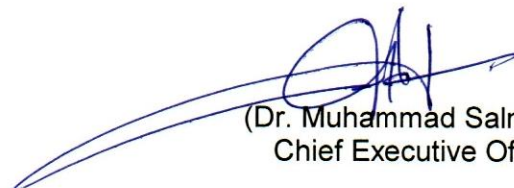
- Reinforce hygiene and sanitation practices in healthcare settings to prevent the spread of infection.
- Encourage the use of masks and other protective measures in outbreak areas.

**6. Coordinate with Local Authorities:**

- Collaborate with local health departments and community organizations to facilitate outreach and vaccination drives.
- Develop contingency plans for potential outbreaks, including mobilization of resources and personnel.

*For any further assistance in this context, the Center for Disease Control (CDC) (051 – 9255237 and Fax No. 051-9255575) and Microbiology Department of Public Health Laboratories Division (051-9255082), NIH may be contacted.*

**The above 'Advisory' may please be circulated widely to all concerned.**

  
(Dr. Muhammad Salman)  
Chief Executive Officer

**Distribution overleaf:**



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48. Medical Superintendent, IHITC, Islamabad
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50. All Deputy Commissioners with the request to direct all concerned departments at district level.
51. Provincial Coordinator, EPI, Punjab, Sindh, KPK, Balochistan, GB and AJK

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