



DIPHTHERIA ALERT

TO:	Deputy Director General: Chief of Operations	
Chief Directors:		Health Programmes
		Metro District Health Services (MDHS)
		Rural District Health Services
		General Specialist and Emergency Services
		Strategy and Health Support
District Managers:		Metro District Health Services (MDHS),
		Substructures Rural Districts and sub-districts
Directors:		Professional Support Services
		Communications
Chief Executive Officers (CEOs):		Central Hospitals
		Regional and Psychiatric Hospitals
		District Hospitals
Managers:		Private Hospitals and Private Clinics
Executive Directors / Heads of Health:		Local Authorities/City of Cape Town
		South Africa Military Health Services

CIRCULAR: H113/2017

DIPHTHERIA CASES IDENTIFIED IN A COMMUNITY IN THE EASTERN SUB-DISTRICT OF THE CAPE TOWN METROPOLITAN DISTRICT

Diphtheria is a contagious and potentially life-threatening bacterial disease. The incidence of diphtheria worldwide and in South Africa has been reduced due to increasing immunisation levels, such that only sporadic cases of disease have been identified and reported.

Two confirmed cases of diphtheria were identified in KwaZulu-Natal province in 2016, and an outbreak of 15 cases occurred in eThekweni, Kwa-Zulu Natal Province in 2015, affecting incompletely immunised children of primary-school-going age.

Diphtheria is caused by a bacterium *Corynebacterium diphtheriae*, and is transmitted by droplet spread and direct contact with infected persons. Diphtheria is preventable by vaccination given at 6, 10, 14 weeks, with booster doses given at 18 months, 6 years and 12 years of age. Persons who are in contact with a confirmed case should receive post-exposure prophylaxis including antibiotics and vaccination to prevent spread of the bacterium, and should have a pharyngeal swab taken.

This alert serves to inform all healthcare workers and health facilities/practitioners of:

- Diphtheria cases in a community in the Eastern sub-district of the Cape Town Metropolitan District
- Summary of the Recommendation for the Management and Public Health Response to Diphtheria

1. Situational Update (10 August 2017)

- A total of 4 cases (3 laboratory-confirmed cases including the index case, 1 probable case) and 1 asymptomatic carrier have been identified. A school contact is awaiting confirmation as an asymptomatic carrier. All cases are epidemiologically linked: 3 are siblings, 1 is the mother of the children, and 1 is an adult neighbour of the family.
- On the 3rd of August, a diagnosis of diphtheria was confirmed in a 10-year old child at a provincial hospital, the child subsequently demised on the 4th of August 2017.
- The index case commenced with symptoms compatible with diphtheria (fever, sore throat) during the week ending on the 26th of July 2017.
- To date, two contacts (siblings of the index case), and the mother of the children have tested positive for the diphtheria bacterium. Diphtheria anti-toxin has been administered to the surviving siblings, along with appropriate antibiotic treatment, and they remain in a stable condition.
- Provincial and district health services has identified contacts of the family, including household members, pupils at the school attended by the index case and health care workers who provided care to the index case - in order to identify and prevent additional cases. The appropriate vaccination and antibiotic therapy was provided to the close contacts and eligible at-risk contacts.
- In addition, more than 600 individuals have been vaccinated in this specific community.
- All contacts of the family that presents with symptoms compatible with diphtheria are currently being investigated and results of laboratory tests are awaited.
- In response to the confirmed cases, a selective vaccination campaign targeting the at-risk groups in this community is planned.

2. Recommendation for the Management and Public Health Response to Diphtheria

Clinicians and other healthcare workers district and sub-district public health officials must be alerted to the possibility of the clinical diagnosis of diphtheria, the importance of notifying suspected cases and laboratory confirmation.

2.1 Diphtheria Guidelines

Attached, please find the following resource document

- Annexure 1: Summary Recommendations for the Management & public health response to diphtheria
- NICD recommendations for the Management and Public Health Response to Diphtheria, dated 22 March 2017
- Diphtheria Frequently asked questions, dated 21 December 2016
- Diphtheria Contact Questionnaire
- Diphtheria Contact Line List

2.2 Diphtheria case definitions:

- Diphtheria is a notifiable medical condition in South Africa.

Case Definitions	
Suspected case	A person who presents with an upper-respiratory tract illness characterised by sore throat, low-grade fever AND an adherent membrane of the nose, pharynx, tonsils, or larynx.
Confirmed case	A person presenting with an upper respiratory tract symptoms with or without an adherent membrane AND culture or detection by PCR of <i>C. diphtheriae</i> or <i>C. ulcerans</i> or <i>C. pseudotuberculosis</i> from a clinical specimen which is confirmed to be toxin producing by ELEK testing or <i>tox</i> gene positive by PCR.
For case definitions of probable & possible cases, and asymptomatic carriers, see page 10 in attached guideline.	

2.3 Public Health Response: Key points:

- These measures listed below must be implemented by both **public and private healthcare providers, health practitioners and sub-district and district health offices.**

Measures for implementation to ensure early detection and public health response to diphtheria cases

	Objective	Action
1.	Intensify surveillance and notification and reporting of suspected measles cases	<ul style="list-style-type: none"> ✓ All suspected/probable/confirmed cases should be reported IMMEDIATELY reported to: <ul style="list-style-type: none"> ○ the Infection Prevention and Control (IPC) Practitioners at health care facilities where applicable, as well as ○ District and Provincial Communicable Disease Control Coordinators, urgently. ✓ Contact the Communicable Disease Control (CDC) sub-directorate: Ms Charlene A. Jacobs/Mr Hlengani Mathema at 021-483-9964/3156/6878 (tel.), 086-6111-092 / 021-483-2682 (fax), 072-356-5146, 082-327-0394 (cell), if a suspected case is detected at your facility or diphtheria (toxigenic <i>Corynebacterium diphtheriae</i>) is identified at the laboratory. ✓ Email: charlenea.jacobs@westerncape.gov.za and Hlengani.mathema@westerncape.gov.za ✓ Infection prevention and control measures and supportive care must be initiated. ✓ The attached Diphtheria Contact Questionnaire and Diphtheria Contact Line List can be used.
2.	Adequate clinical management of cases	<ul style="list-style-type: none"> ✓ Isolation and treatment of the index case - administration of diphtheria antitoxin (DAT), antibiotics and immunisation (booster dose for confirmed and probable cases once clinically stable, with vaccine appropriate for age and immunisation history) <p><u>See the attached:</u></p> <ul style="list-style-type: none"> ✓ Annexure 1: Summary Recommendations for the Management & public health response to diphtheria ✓ NICD recommendations for the Management and Public Health Response to Diphtheria, dated 22 March 2017
3.	Public Health Response to a case or outbreak to diphtheria	<ol style="list-style-type: none"> 1. Conduct a detailed case investigation (demographic, clinical and risk factor information; case line list, case-contact line list – see attached) 2. Identify contacts 3. Conduct laboratory investigation of close contacts and eligible at-risk contacts <ul style="list-style-type: none"> ○ Isolation of <i>C. diphtheriae</i> on culture and toxigenicity testing (Elek test) 4. Administer chemoprophylaxis to close contacts and at-risk contacts 5. Monitor close and eligible at-risk contacts (prophylactic antibiotics, booster vaccination appropriate for age, throat swabs for diphtheria diagnosis) 6. Exclude close and eligible at-risk contacts in high-risk occupations 7. Vaccinate close and eligible at-risk contacts 8. Alert other healthcare facilities in the area 9. Conduct health promotion activities and health education 10. Vaccination campaigns in response to outbreaks <ul style="list-style-type: none"> ○ Selective vaccination campaigns targeting at-risk groups in response to an outbreak.

District and sub-district health authorities must put measures in place to improve the routine vaccination coverage in the primary series (6, 10, 14 weeks) and booster doses at 18 months, 6 and 12 years of age.

Kindly bring the content of this alert/circular to the attention to all healthcare workers at your facility, institution, sub-district or district.

We trust on your continued support in the early detection, report and control of communicable diseases in the Western Cape Province.

Yours sincerely.



DR. B. ENGELBRECHT

HEAD OF HEALTH

DATE: 2017-08-11

Annexure 1: Summary Recommendations: Management & Public Health Response to Diphtheria

Background

- Diphtheria is a contagious and potentially life-threatening bacterial disease caused by infection with toxin-producing (toxigenic) strains of *Corynebacterium diphtheriae*, *C. ulcerans* or rarely *C. pseudotuberculosis*.
- It usually affects the upper respiratory tract mucosa ('respiratory' diphtheria), but can also affect the skin (cutaneous diphtheria) and rarely other sites (including the eye, ear or genitals).
- A toxin produced by the bacteria causes local tissue damage (with inflammation, ulceration, oedema and a pseudomembrane), and can be absorbed into the bloodstream (affecting the heart, nervous system or kidneys).
- Diphtheria is spread via large respiratory droplets, or direct contact with infected skin lesions or respiratory secretions, or rarely by fomites. The incubation period for respiratory diphtheria: usually 2-5 days (range 1- 10 days).
- Respiratory diphtheria cases are contagious during symptomatic disease, and sometimes also during the incubation period and convalescence (for days to weeks). Healthy people may also be asymptomatic carriers for variable periods (days to months). Carriage can be eradicated by antibiotic treatment.

Prevention

Diphtheria is preventable through immunisation. The Expanded Program of Immunisation (EPI) schedule includes 6 doses of diphtheria toxoid-containing vaccine, given in combination with other antigens in various formulations:

Primary vaccination series

Age of child	Vaccine
6 weeks	Pentaxim [®] OR Infanrix-Hexa [®] OR Hexaxim [®]
10 weeks	Pentaxim [®] OR Infanrix-Hexa [®] OR Hexaxim [®]
14 weeks	Pentaxim [®] OR Infanrix-Hexa [®] OR Hexaxim [®]

Booster vaccination series

Age of child	Vaccine
18 months	Pentaxim [®] OR Infanrix-Hexa [®] OR Hexaxim [®]
6 years	Diftavax [®] OR Infanrix [®] OR Adacel Quadra [®] OR Boostrix Tetra [®]
12 years	Diftavax [®] OR Adacel Quadra [®] OR Boostrix Tetra [®]

Immunity declines following immunisation, and many (20-80%) adults are susceptible to diphtheria. Adults working in high diphtheria exposure risk settings are encouraged to receive a booster dose (e.g. healthcare workers, school teachers, nursery/crèche staff, staff working in child-care settings) with bivalent Td (Diftavax[®]) or quadrivalent Tdap-IPV (Adacel Quadra[®], Boostrix Tetra[®]) vaccine.

Clinical features

- Signs and symptoms include: mildly painful tonsillitis/pharyngitis with a pseudomembrane; adenopathy and anterior neck swelling (bull-neck); hoarseness and stridor; palatal paralysis; serosanguinous nasal discharge with associated mucosal membrane; and low-grade fever.
- The pseudomembrane is usually grey, thick, and firmly adherent, and bleeds when scraped/manipulated.
- Systemic complications of diphtheria include cardiac toxicity (myocarditis, acute congestive failure), neurotoxicity (paralysis of soft palate, cranial neuropathies and peripheral neuritis) and renal toxicity (renal failure). Cardiac and neurological complications can be acute or delayed (up to a few weeks) after illness.

Suspected diphtheria case definition

A person who presents with an upper-respiratory tract illness characterised by sore throat, low-grade fever AND an adherent membrane of the nose, pharynx, tonsils, or larynx.

Management of a suspected case of diphtheria

- IMMEDIATELY report the case to infection prevention and control practitioners at healthcare facilities, or directly to District and Provincial Health Department Communicable Disease Control Coordinator: 021-483-9964/3737/3156 or 072-356-5146
- **Infection prevention and control:** Isolate patient until the diagnosis is confirmed or excluded; standard, contact and droplet precautions are indicated
- **Supportive care:** careful monitoring (ideally in a high care or ICU) for local (e.g. airway obstruction or respiratory compromise) or systemic (especially cardiac) complications. Refer to, or consult with, infectious disease specialists where possible
- **Collect samples for diphtheria diagnosis:** Collect swabs from nose and throat. If pseudomembrane present, swab beneath, and collect a tissue sample where possible. Swab skin lesions if cutaneous disease suspected. Specifically request culture for diphtheria on lab submission slip, and alert laboratory. Collect samples before antibiotic treatment given if possible.
- **Diphtheria antitoxin treatment (DAT):** DAT should be given to all probable classic respiratory diphtheria cases without waiting for laboratory confirmation. DAT neutralises circulating unbound diphtheria toxin and prevents

progression of disease; delaying administration increases mortality. The dosing of DAT is product-specific; refer to package insert.

- **Antibiotic treatment:** this is not a substitute for DAT treatment. Antibiotics don't affect healing of local infection, but eradicate the bacteria from the nasopharynx and prevent transmission to others. **A follow up swab must be taken to confirm elimination of carriage, both for cases and asymptomatic contacts.**

1. Parenteral treatment for patients unable to swallow				Antibiotic therapy must be given for a total of 14 days.
	Penicillin G	Erythromycin	Comment	
Children	50 000 units/kg/dose IV 12 hourly	15-25 mg/kg/dose 6 hourly IV (max 1g per dose)	Can switch from parenteral treatment to oral treatment as soon as patient able to swallow.	
Adults	50 000 units/kg/dose (max 1.2 million units per dose) IV 12 hourly	15-20 mg/kg/day (max 4g per dose) in 4 divided doses 6 hourly		
2. Oral treatment for patients able to swallow				
	Penicillin V	Macrolides		
		Erythromycin	Azithromycin	
Children	15 mg/kg/dose (max 500 mg per dose) po 6 hourly	15-25 mg/kg/dose (maximum 1g per dose) po 6 hourly	10 mg/kg po daily	
Adults	500 mg po 6 hourly	500 mg – 1g po 6 hourly (max 4g/day)	500 mg po daily	

- **Immunisation:** infection does not reliably induce protective antibody levels, so all confirmed or probable cases should receive a booster dose once they are clinically stable, with a vaccine appropriate to age and immunisation history.

Public health response: this will be undertaken by Department of Health officials

- **Identify contacts**

Close contacts include:

- Having close contact with the patient in a household-type setting. This includes: those living and/or sleeping in the same household; scholars/students etc. who sleep in the same dormitory/flat or have shared kitchen facilities etc.; and kissing/sexual contacts of the patient
- If the index case is a young child, child-minders/nannies who care for the child
- Healthcare workers who have given mouth-to-mouth resuscitation to the patient or dressed the wounds of a cutaneous case without appropriate infection control procedures

At-risk contacts: risk of disease depends on the duration of contact and immunisation status. These must be assessed on a case by case basis. Examples include: friends, relatives, and caregivers who regularly visit the home; school/pre-school class contacts; those who share the same room at work; other healthcare workers who have had contact with the case.

- **Monitor close contacts** for signs/symptoms of diphtheria for at least 10 days after last contact with the index case. Educate them about the disease and advise them to seek medical care if they develop symptoms.
- **Laboratory investigation of close contacts and at-risk contacts:** All close contacts and at-risk contacts should have nasal and pharyngeal swabs taken for culture to exclude that they are carriers. Should a contact test positive for toxigenic *C. diphtheriae*, the person will need to be isolated with standard, contact and droplet precautions until two cultures (taken at least 24 hours apart) taken from both nose and throat >24 hours after completing antibiotic therapy are negative for *C. diphtheriae*.
- **Post-exposure chemoprophylaxis for close and at-risk contacts**

Benzylpenicillin, erythromycin, or azithromycin may be given for chemoprophylaxis as follows:

Age group	Benzylpenicillin	Erythromycin	*Azithromycin
Children	<6 years: Single dose: 600 000 units IM	<2 years: 125 mg 6 hourly po for 7 days	10 mg/kg per day on day one then 5 mg/kg per day for four days (total of 5 days)
		2-8 years: 250 mg 6 hourly po for 7 days	
	>6 years: Single dose: 1.2 million units IM	>8 years: 500 mg 6 hourly po for 7 days	
Adults	Single dose: 1.2 million units IM	500 mg 6 hourly po for 7 days	500 mg po on day one then 250 mg po daily for four days (total of 5 days)

*The Azithromycin column is not included in the latest version of the NICD Diphtheria guidelines, it has been discussed and endorsed by the NICD.

- **Vaccinate close and eligible at-risk contacts**

All unimmunised/incompletely immunised contacts ≤12 years should complete their primary vaccination and booster doses as per the EPI schedule. Adolescents and adults may also be offered a booster dose of diphtheria-containing vaccine (Diftavax® OR Adacel Quadra® OR Boostrix Tetra®).