



Toxigenic diphtheria outbreak at a correctional facility in Western Cape Province, South Africa, October 2023

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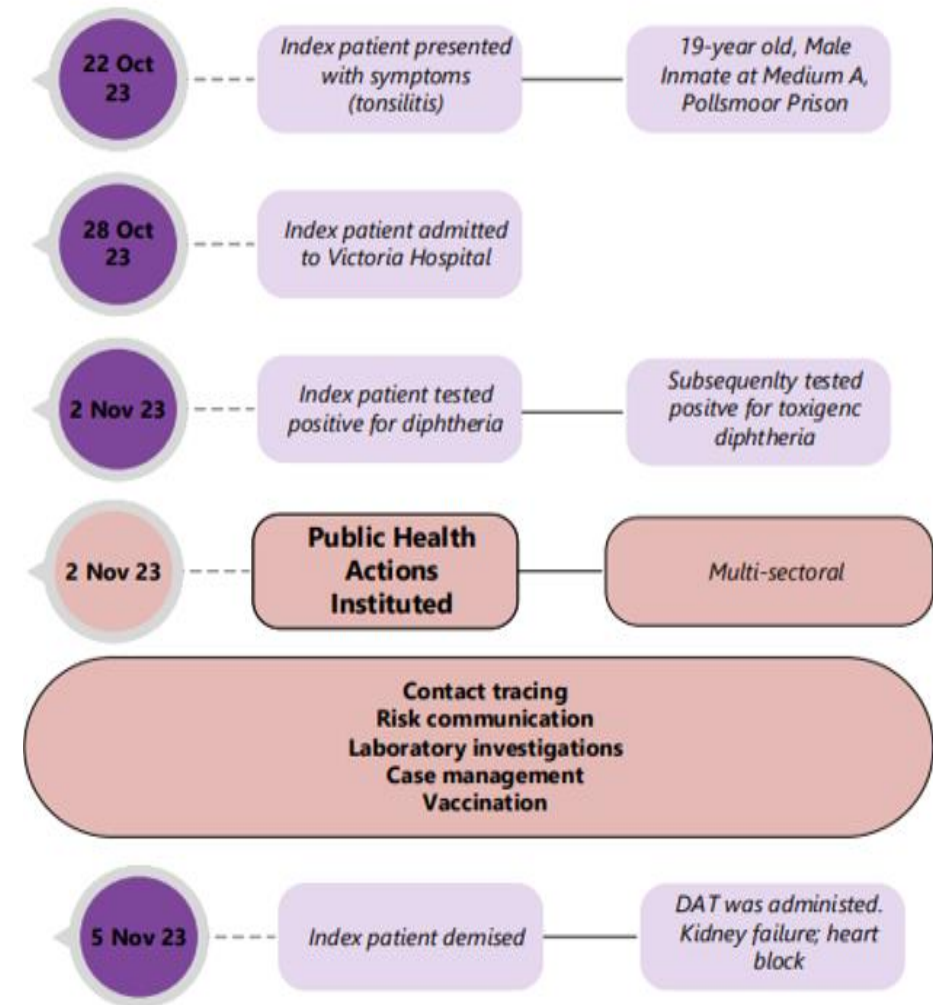
Introduction

- Diphtheria is contagious life-threatening **bacterial disease** that is **preventable by vaccination** caused by toxin-producing strains of *Corynebacterium diphtheriae*¹
 - Diphtheria presents commonly as a membranous pharyngitis.
 - Diphtheria can be respiratory or cutaneous.
- Between 1 January – 20 October 2023 the NICD confirmed 12 cases of *C.diphtheriae* in South Africa, of which 5 individuals had toxigenic diphtheria.
- **National Vaccination Coverage** for Diphtheria Tetanus Pertussis vaccine: DTP 1 (81%) and DTP 3 (79%) in South Africa 2023.³



Background

- Suspected diphtheria case **notified** on **28 October 2023** from a district hospital in the Cape Town.
 - Patient was inmate at a correctional facility.
 - Tonsil swabs collected on **30 October**
- Patient was transferred to tertiary hospital
 - Received diphtheria antitoxin
- **2 November 2023**
 - Swab positive for *C. diphtheria* on culture
 - Subsequently tested toxin-gene positive on PCR
- Patient demised on **5 November**.



Aim and Objectives

We investigated a respiratory toxigenic diphtheria case from a correctional facility in the Cape Town Metro District.

- **Our objectives were to:**
 - Determine the **extent** of the outbreak
 - Describe cases by person and time
 - Implement **control** and **preventative** measures.

Methods

- **Setting and population:**

- Inmates and DCS officials from a correctional facility (Medium A), Southern Sub-district, Cape Town

- **Data Collection:**

- **Case Investigation Forms, close contact lists** for clinical and demographic information.
- **Laboratory investigation reports** and line lists for nasopharyngeal specimens from cases and contacts collected for analysis.
- **Case definitions** utilized to meet criteria.
- Comprehensive line lists created using MS Excel.

- **Data Analysis:**

- Descriptive analysis by person, place and time.
- Mean age, case fatality rate, attack rate of positive cases/contacts.



Case definitions

Suspected case: any person from medium A of the correctional facility presenting with **sore throat, fever, membrane of nose, tonsils, pharynx or larynx.**

Confirmed case: any person from medium A of the correctional facility **with signs and symptoms consistent with diphtheria and a positive culture or PCR detection of C. Diphtheria** from a clinical specimen confirmed to be toxigenic.

Results

Case fatality rate (CFR) :

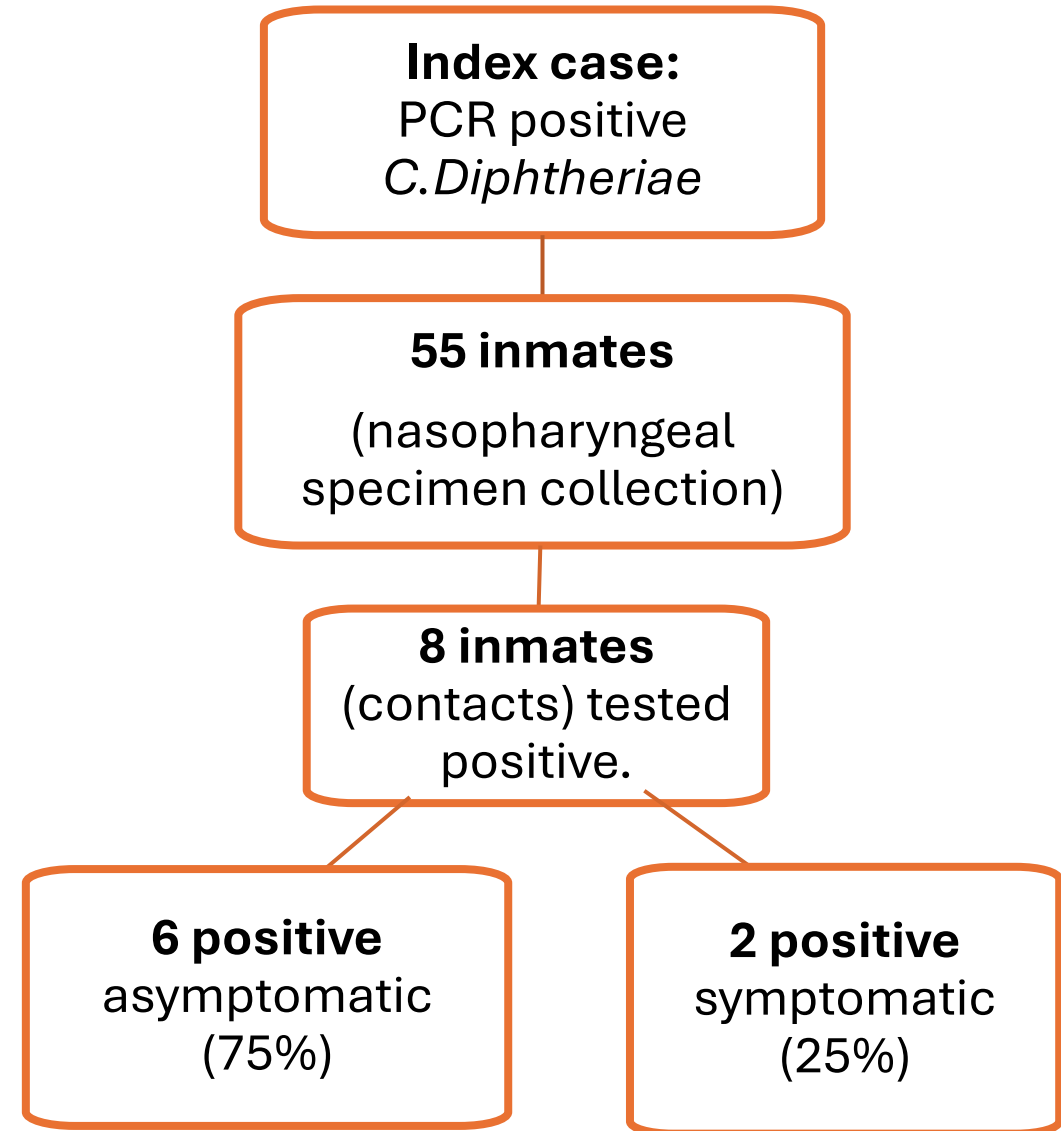
$$1/9 \times 100 = 11\%$$

Mean age of positive cases:

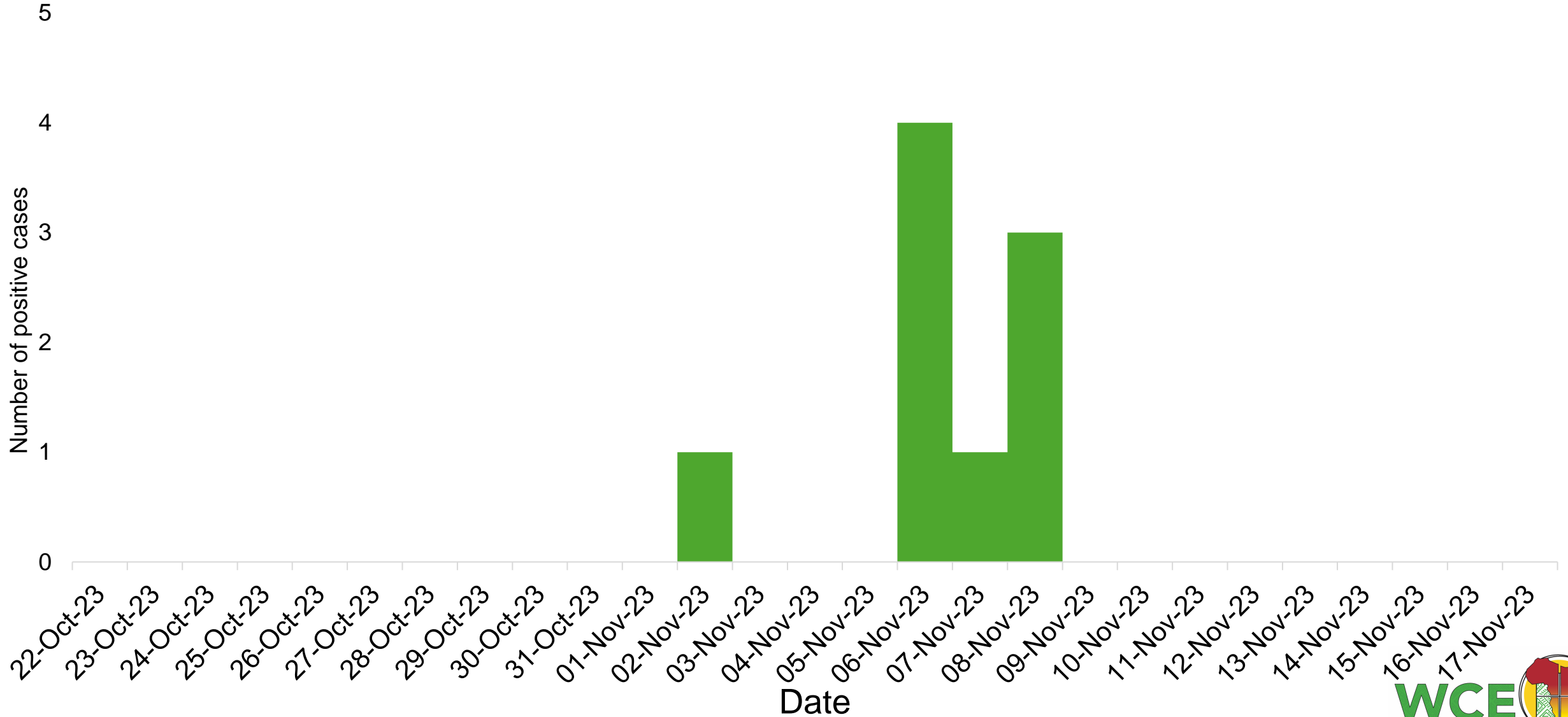
22 years old

Attack rate:

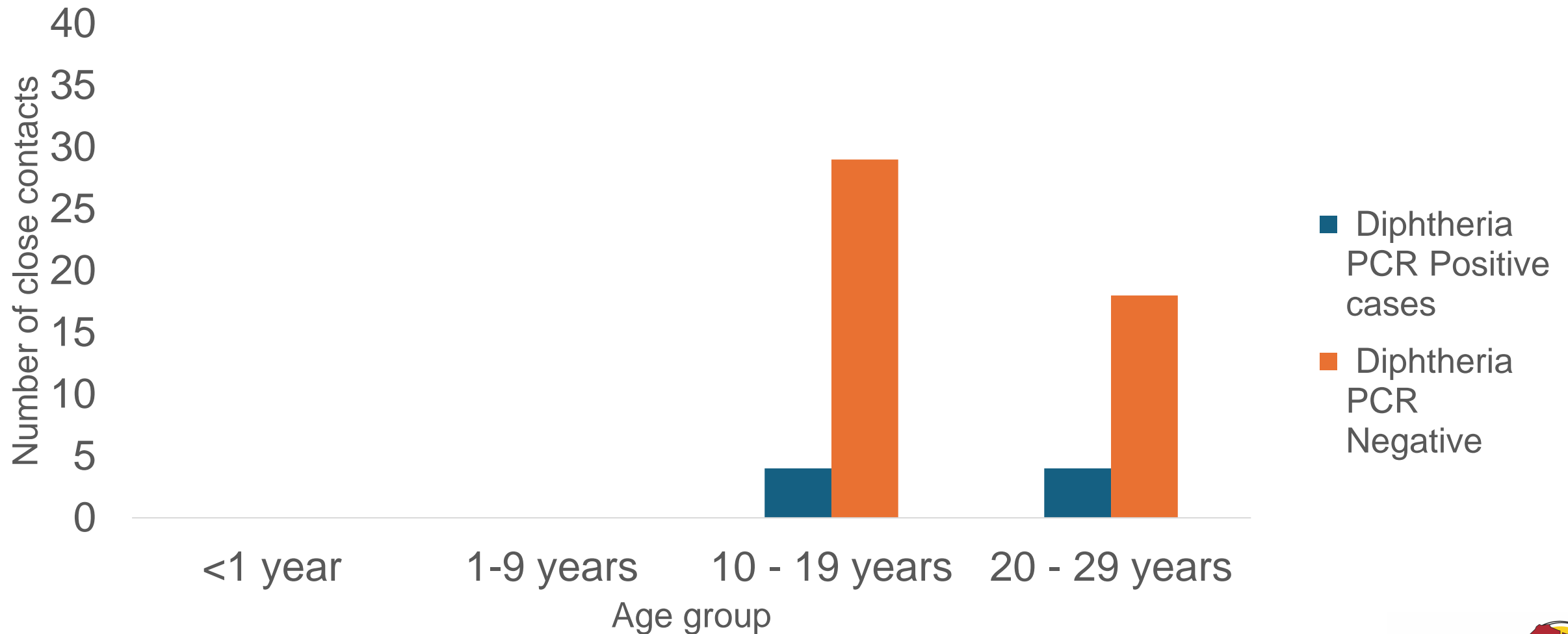
$$9/55 \times 100 = 16\%$$



Positive diphtheria results of inmates at the correctional facility by date of confirmed lab results, October – November 2023 (n = 9)



Age category of diphtheria close contacts (inmates) at the correctional facility stratified by PCR results, October – November 2023 (n=55)



Laboratory findings for diphtheria contacts following a toxigenic respiratory case, Cape Town, November 2023

Contact	Swabs collected	Culture Results		PCR	
		Positive	Negative	Positive	Negative
Ambulance: Carer	1		1		1
Ambulance: EMS	2		2		2
Ambulance: Patient	1		1		1
GSH: Patient	1		1		1
HCW	4		4		4
Inmate	55	6	49	8	47
Warden	11		11		11
District Hospital: HCW	4		4		4
Total	79	6	73	8	71

Public Health Actions (1)

Intensified Surveillance

- Swabbing, provision of prophylaxis, vaccination to **at-risk** and **close contacts**.
- **Ensure antibiotic** administration to **positive contacts, co-horted** in isolation.
- **Re-testing** of positive contacts 14 days after treatment

Clinical Management and Infection Prevention and Control

- Additional **DAT** procured.
- **Clinical guidelines compiled** for eligibility of antitoxin; and methods of isolation and de-isolation of cases and contacts.

Vaccination Campaign at Medium A of correctional facility

- 123 staff and 484 inmates vaccinated (6 – 15 November 2023)

Public Health Actions (2)

Risk Communication:

- **Press statements** by National Department of Health and Department of Correctional Services on 9 November.
- **Provincial circular** for healthcare workers issued
- Communication targeted towards stakeholders, and the public.
- Dissemination of **Situational reports**.



MEDIA STATEMENT

To: Editors & Health Journalists
 Issued by: Department of Health
 Date: Thursday, 09 November 2023

Health Minister announces Diphtheria Outbreak disease in the Western Cape

Pretoria: Minister of Health, Dr Joe Phaahla would like to announce the outbreak of Diphtheria disease at the Pollsmoor Correctional Centre in the Western Cape Province. A 19 year-old male inmate presented with Diphtheria symptoms on the 28th October 2023 and was referred to the local hospital for further medical care.

Throat swabs were collected the same day for culture laboratory testing and the results came back positive five days later (2 November). Unfortunately, his health condition continued to deteriorate until he regrettably passed away on the 5th November 2023.

The public health measures were undertaken to put the outbreak under control, and these include contact tracing of inmates, correctional services staff, consulting healthcare workers and emergency services personnel. More tests were conducted with the 55 identified close contacts as part of case investigation and the results of 8 inmates tested positive for diphtheria, two of them presenting with mild symptoms and the other six are asymptomatic. All patients including the deceased fall within the age group of 18 to 23 years old.

Immediate contacts of the patients and the deceased have been put in isolation from the rest of the correctional centre section to prevent further spread of the disease. Two staff members displayed symptoms compatible with diphtheria and have received treatment whilst waiting for their laboratory test results.

The Western Cape Department of Health Disease Outbreak Team working together with the Department of Correctional Services, have embarked on a vaccination campaign in the affected section of the correctional centre.

Two laboratory-confirmed cases of diphtheria disease were recorded earlier in the year from an adult in KwaZulu-Natal and a child in the Western Cape.

Diphtheria is an uncommon, but vaccine preventable serious infection caused by a toxin producing bacterium called *Corynebacterium diphtheria*. The toxin may lead to difficulty in breathing, heart rhythm problems, and even death. The bacteria spreads from person to person, usually through respiratory droplets from coughing or sneezing.



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TO: Chief Directors Metro Health Services (MHS) Rural Health Services (RHS) Strategy Metro Substructures Rural Districts Professional Support Services Emergency Medical Services Forensic Pathology Services Facilities Management Provincial Environmental Health
Chief Executive Officers (CEOs): Control, Regional and District Hospitals Private Hospitals and Private Clinics
Managers: Health of Health / Executive Directors: Local Authorities/Municipalities/City of Cape Town South African Military Health Services National Health Laboratory Services Private Laboratories General Practitioners
Managers: Regional Commissioner: Department of Correctional Services

CIRCULAR: H_146_2023 DIPHTHERIA ALERT: PREPAREDNESS & PUBLIC HEALTH RESPONSE TO DIPHTHERIA. IDENTIFICATION OF TOXIGENIC RESPIRATORY CASES IN THE CAPE TOWN METRO DISTRICT

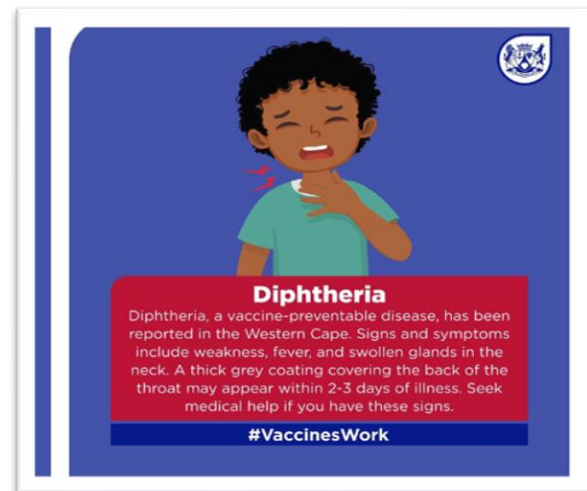
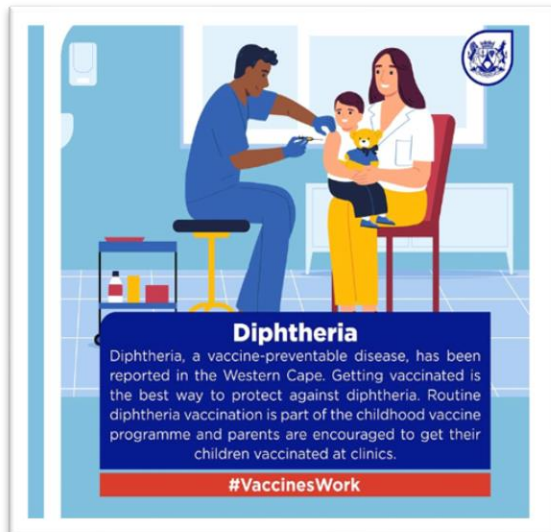
This circular is an update of Circular H11/2021, issued on 30/04/2021.

Diphtheria is a contagious and potentially life-threatening bacterial disease. It is a vaccine-preventable disease, however a drop in vaccine coverage could potentially lead to increased numbers of cases. Diphtheria is preventable by vaccination given at 4, 10, 14 weeks, with booster doses given at 18 months, 6 years, and 12 years of age.

Diphtheria is a rare disease and clinicians need to have a high index of suspicion to make an early diagnosis. Rapid contact tracing, testing, the administration of prophylactic antibiotics, and vaccination can contain outbreaks.

While diphtheria antitoxin is recommended as part of the treatment of patients with diphtheria, it is in short supply globally and limited supplies are available in South Africa. Clinicians involved in the care of patients with diphtheria will manage the appropriate use of diphtheria antitoxin. Infectious disease specialists should be consulted with respect to this treatment. In the absence of antitoxin, involve appropriate antibiotics and supportive care.

Diphtheria disease is a nontoxic condition caused by infection with toxin-producing strains of *Corynebacterium diphtheriae* (C. diphtheriae or rarely C. jeikeium or C. pseudotuberculosis) and presents most commonly as a membranous pharyngitis, large neck glands (but neck appearance) and low-grade fever are associated symptoms. A



Discussion

- **Early identification** of suspected cases and **treatment with antitoxin** is important based on clinical suspicion prior to laboratory confirmation
 - Treating clinician should **consult with ID specialist**
- **Rapid identification and follow-up of close contacts** led to the identification of **8 positive contacts**.
- **Targeted vaccination campaign** in Medium A section **curbed further spread**.
- The **drop in vaccination coverage** in the primary series and booster doses, can lead to increased number of cases.
 - Sub-optimal 6 & 12-year-old Td coverage in the Province (ranging from **20% - 40%**)
 - Unknown or incomplete vaccination, over years can lead to waning immunity.

Conclusion

- **Prompt public health action** to suspected diphtheria cases is critical to curb transmission in especially densely populated settings.
- Concerted efforts are needed to **improve vaccination coverage & provision of booster vaccines to prevent of diphtheria.**
- Healthcare workers need to be alert and vigilant **to detect, notify and investigate suspected diphtheria cases.**

Acknowledgements

- Western Cape Department of Health & Wellness
 - Provincial Communicable Disease Control, Pharmacy Services, Communication
 - Metro Health Services (MHS) Chief Directorate Office
 - Southern Western Sub-Structure (MHS)
 - City of Cape Town
 - Hospital IPC practitioners and clinicians
- National Health Laboratory Services (Greenpoint, Groote Schuur Micro)
- National Department of Health
- National Institute for Communicable Diseases (NICD)
- Department of Correctional Services personnel

References

1. Western Cape Government: Health (WCGH) Circulars (2024) Circular H146 of 2023 Diphtheria Alert

Link: <https://www.westerncape.gov.za/general-publication/western-cape-coronavirus-covid-19-partners-western-cape-government-health-wcgh-circulars>

2. World Health Organisation: Immunization data (2024)

Link: <https://immunizationdata.who.int/global/wiise-detail-page/diphtheria-reported-cases-and-incidence?CODE=Global+ZAF&YEAR=>

3. UNICEF: Immunization coverage data (2024)

Link: <https://data.unicef.org/topic/child-health/immunization/>