# Situational Report, Week 7, 2025

## Toxigenic *Corynebacterium diphtheriae* disease in South Africa in 2024-2025

**Date of report**: 21 February 2025
**Date until which data included**: 1 January 2024 to 16 February 2025
**Report compiled by**: Centre for Respiratory Diseases and Meningitis (CRDM), National Institute for Communicable Diseases (NICD)

**Highlights:**

- In the last epidemiologic week (week 7), the following number of new cases were reported
  - 1 laboratory-confirmed case of toxigenic respiratory diphtheria in the Western Cape
  - 7 asymptomatic carriers of toxigenic *C. diphtheriae* in the Western Cape
  - No suspected respiratory diphtheria cases were reported from other provinces
- Public health response has been initiated for each case

**Table 1: Number of suspected and confirmed cases of respiratory diphtheria, South Africa January 2024 to 16 February 2025[1]**

| Case definition | Number | Provincial distribution |
|---|---|---|
| **Laboratory-confirmed toxigenic respiratory diphtheria** | 26 | ○ Gauteng (1/26, 5%)<br>○ KwaZulu-Natal (1/26, 5%)<br>○ Western Cape (24/26, 90%) |
| **Probable diphtheria cases** | 0 | |
| **Suspected diphtheria cases[2]** | 179 | ○ Eastern Cape (4/179, 2%)<br>○ Free State (3/179, 2%)<br>○ Gauteng (15/179, 8%)<br>○ KwaZulu-Natal (11/179, 6%)<br>○ Mpumalanga (3/179,2%)<br>○ Northern Cape (1/179, 1%)<br>○ North West (4/179, 2%)<br>○ Western Cape (138/179, 77%) |
| **Asymptomatic carriers of toxigenic *C. diphtheriae* identified during contact tracing** | 27 | Gauteng (1/27, 5%)<br>Western Cape (26/27, 95%) |
| **Deaths in cases with laboratory-confirmed toxigenic respiratory diphtheria** | 6 | Gauteng (1/6, 17%)<br>Western Cape (5/6, 83%) |
| **Number of suspected cases awaiting results** | 0 | |

[1]For case definitions please see Table 2 at the end of this report

[2]Clinical notifications of patients with specimens sent to exclude diphtheria who tested negative

**Public health actions instituted**

For every case, a public health response has been initiated. Public health response includes the swabbing of close contacts, isolation of at-risk contacts, provision of prophylaxis and vaccination of contacts. These public health actions are instituted for contacts in all settings including household, work, healthcare facility staff and emergency medical services staff. Additional vaccination campaigns have been conducted in schools and communities in the Western Cape.

**Epidemiology of cases 1 January 2024- 16 February 2025**

Between 1 January 2024 and 16 February 2025, 26 confirmed cases of respiratory diphtheria and 27 asymptomatic carriers of toxigenic C. *diphtheriae* detected during contact tracing have been identified in South Africa. The majority of confirmed cases and carriers (94%, 50/53) were from the Western Cape, comprising 24 respiratory diphtheria cases and 26 asymptomatic carriers (Figure 1, Table 1). The median age of cases of confirmed respiratory diphtheria was 28 years (range: 3–42 years), with 73% (19/26) aged over 18 years and the case-fatality ratio was 23% (6/26).

In the first half of 2024, two confirmed respiratory diphtheria cases were reported—one in KwaZulu-Natal and one in the Western Cape. Between week 31 (beginning 29 July 2024) and week 37 (beginning 9 September 2024), a cluster of three respiratory diphtheria cases and seven asymptomatic carriers was identified in a school-linked community in the Western Sub-District of Cape Town. Additionally, two sporadic confirmed respiratory diphtheria cases were reported in Cape Town during this period, unlinked to this cluster.

Since week 46 (week starting 11 November 2024) there has been a marked increase in diphtheria cases in the **Western Cape** (City of Cape Town) with 18 respiratory diphtheria cases and 19 asymptomatic contacts testing positive for toxigenic *C. diphtheriae.* This included 3 clusters. Two clusters were linked to a correctional facility in Cape Town: the first occurred in weeks 50 (beginning 9 December) – 51 (beginning 16 December) of 2024, involving one confirmed respiratory diphtheria case and 12 asymptomatic carriers. The second cluster was reported in week 7 (beginning 10 February) of 2025, with one confirmed respiratory case and seven carriers. Another Western Cape cluster was recorded in weeks 1 (beginning 30 December) and 2 (beginning 6 January) of 2025, involving three confirmed respiratory diphtheria cases in children who regularly played together. An additional 13 confirmed respiratory diphtheria cases in the Western Cape were identified since week 46 of 2024 with no identified epidemiological links. In **Gauteng**, in week 2 of 2025 (week starting 13 January 2025), one cluster was reported, including one confirmed respiratory diphtheria case and one asymptomatic contact testing positive for toxigenic *C. diphtheriae* (Figure 1)**.**

**Notified suspected cases of diphtheria 1 January 2024 and 16 February 2025**

From 1 January 2024 to 16 February 2025, 179 individuals have been reported as suspected diphtheria cases and tested negative for toxigenic *C. diphtheriae*. Alternate diagnoses became available for some of the individuals with suspected diphtheria, and included *Streptococcus pyogenes*, *Corynebacterium spp* NOT *diphtheriae,* Ludwig's angina, retrobulbar abscess or respiratory viruses including SARS-CoV-2.

**Non-toxigenic diphtheria**

From 1 January 2024 to 16 February 2025, 11 cases of non-toxigenic cutaneous diphtheria have been confirmed nationally including, 10 cases of *C. diphtheriae* and one *C. ulcerans*.

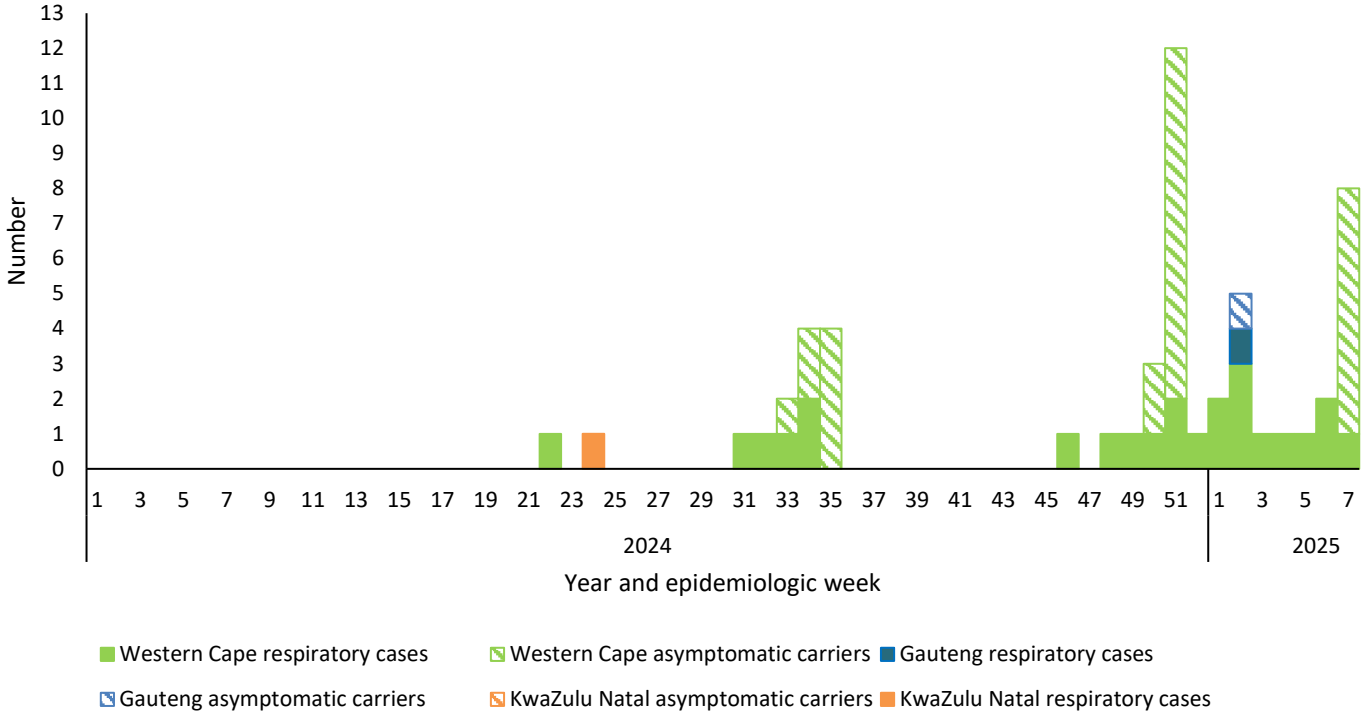


**Figure 1: Number of individuals testing positive for toxigenic *C. diphtheriae* (respiratory diphtheria cases and asymptomatic carriers), South Africa, 1 January 2024 to 16 February 2025**

## Microbiology

Among the 53 toxigenic *C. diphtheriae* infections identified, 30 had viable isolates available for further characterisation. The phenotypic Elek test (to confirm toxin production) correlated 100% with PCR for those isolates that have had both *tox* gene PCR and Elek performed (n=14). Antimicrobial susceptibility testing showed that all tested isolates (n=16) were susceptible to penicillin (MIC range 0.016-0.25 µg/ml) and erythromycin (MIC range 0.016-0.094 µg/ml), using the Clinical and Laboratory Standards Institute (CLSI) guidelines for interpretation (1). Similarly, using EUCAST interpretation, the 16 isolates were susceptible to erythromycin, and "susceptible with increased exposure" to penicillin (i.e. susceptible at higher doses) (2). Twenty-two isolates sequenced to date are all ST906, the same lineage that was first detected in the Western Cape in 2023 and appears to be localised in this province currently. Elek, antimicrobial susceptibility testing, and whole genome sequencing (for lineage determination) is ongoing. So far, we have not identified any isolates that are toxin gene bearing but not producing the toxin phenotypically - this is determined through correlation of Elek results with PCR results as non-toxigenic toxin-gene bearing (NTTB) isolates would be Elek negative but PCR positive for the toxin gene.

## Vaccination status among respiratory diphtheria cases

Of the 26 respiratory diphtheria cases, 6 cases were among children under 12 years. Vaccine history is available for 3 of these. One symptomatic case (aged 9 years) had only received three infant doses of vaccine but no booster doses and the other two were reported as unvaccinated.

## Historical epidemiology of diphtheria in South Africa 2015-2023

*Data are provisional as on date data extracted. Number of consultations/specimens are reported/analysed by date of consultation/specimen collection. Data cleaning is ongoing and this may result in some changes in subsequent reports.*

Between 2015 and 2023, the National Institute for Communicable Diseases (NICD) confirmed 42 toxigenic *Corynebacterium diphtheriae* infections, comprising 26 respiratory diphtheria cases, 14 asymptomatic carriers detected through contact tracing, and 2 cases of cutaneous diphtheria. All respiratory cases were reported from the Western Cape (n=9) or KwaZulu-Natal (n=17). The highest annual totals occurred in 2015 (n=11) and 2023 (n=6), while other years reported between 0 and 4 cases.

## Information for clinicians

### Clinical presentation of respiratory diphtheria

Respiratory diphtheria is a vaccine-preventable illness caused by toxigenic *C. diphtheriae* (and more rarely *C. ulcerans* or *C. pseudotuberculosis*), and can occur in persons of all ages.
The clinical presentation includes the following signs and symptoms:

- sore throat
- low-grade fever
- AND an adherent membrane of the nose, pharynx, tonsils, or larynx (Figure 2) - the membrane is greyish-white and firmly adherent to the tissue
- AND/OR enlarged glands in the neck (bull neck)
- toxin-mediated systemic signs including myocarditis, polyneuropathy and renal damage

### Patient management

Treatment includes antibiotics (azithromycin or penicillin) to clear the organism from the throat and prevent onward transmission, and diphtheria anti-toxin (DAT) to neutralise unbound toxin. The dosage of DAT is determined by the duration and severity of illness. **Treatment, contact tracing and chemoprophylaxis should be started prior to laboratory confirmation**. Early administration of DAT may be life-saving and should not be delayed in cases with a high index of suspicion. Supportive care is primarily aimed at airway management and includes providing oxygen, monitoring with electrocardiogram and intubation or performance of a tracheostomy if necessary.

DAT is available in South Africa through provincial pharmacies although stocks are limited. Clinicians and pharmacist are advised to secure a source of DAT and set up emergency supply lines. Clinicians may refer to "Guidelines for diagnosis, testing, and treatment of diphtheria" https://www.nicd.ac.za/diseases-a-z-index/diphtheria/. Advice is available from the NICD doctor-on-call on 080 021 2552. The NICD doctor on call is able to link clinicians to infectious disease experts to discuss individual cases if needed. Additional resources include https://iris.who.int/bitstream/handle/10665/375887/WHO-DIPH-Clinical2024.1-eng.pdf

### Laboratory confirmation of *C. diphtheriae*

Most commonly a throat swab should be collected, from below the membrane if possible, using a Dacron, Rayon or nylon-flocked swab. Respiratory lesions may be pharyngeal, tonsillar, laryngeal or nasal – swabs need to be taken from relevant lesions. Ideally, the swab should be placed in Amies or modified Stuart's transport medium (this can be obtained from your local National Health Laboratory Service (NHLS) or private laboratory). However, it is possible to send a dry swab if transport medium is unavailable. The specimen should immediately be transported to the nearest diagnostic laboratory for primary culture on blood agar and ideally on selective and differential media like Hoyle's agar. All isolates and/or clinical

specimens (including other *Corynebacterium* spp. e.g., *C. ulcerans* and *C. pseudotuberculosis*) should be sent to the National Institute for Communicable Disease (NICD) to confirm identification and toxin production. Please alert NICD prior to sending and label specimens clearly: "suspected diphtheria". Laboratory managers may use the NICD recommendations for diagnosis, testing, and treatment of diphtheria on https://www.nicd.ac.za/diseases-a-z-index/diphtheria/, for additional information.

**Notification of cases and public health response.**

Respiratory diphtheria is a **highly contagious vaccine-preventable illness** caused by the toxin-producing strains of *Corynebacterium diphtheriae (C. diphtheriae)* and occasionally *C. ulcerans* and *C. pseudotuberculosis.* **Primary prevention is through vaccination**, including the infant vaccine course (6, 10 and 14 weeks) with boosters at 18 months, 6 years and 12 years of age. Individuals of all ages can seek assistance at public health care clinics (or private facilities) to review their vaccine status and receive booster dose/s as indicated. Health-care workers are reminded to review vaccination records/status of individuals of all ages and recommend vaccine as indicated.

**Respiratory and cutaneous diphtheria is a category 1 notifiable condition and should be notified within 24 hours.**

All suspected cases should be notified urgently to district or provincial communicable disease coordinators (CDCCs) as per notifiable medical condition notification procedures. Contact tracing, including the taking of throat swabs, administration of prophylaxis (azithromycin) with or without catch-up vaccination should start prior to laboratory confirmation. Vaccine campaigns and reassessment of vaccine status should be considered for all patients presenting to primary health care (regardless of symptoms). Additional school and community-based vaccine campaigns should also be considered. https://www.nicd.ac.za/nmc-overview/notification-process/

**Table 2: Case definitions for respiratory and cutaneous diphtheria, South African notifiable medical conditions' flipchart**

| | |
|---|---|
| **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. |
| **Probable 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,<br>**OR**<br>a person who has an epidemiological link to a confirmed case, who has respiratory tract symptoms but no membrane,<br>**OR**<br>a person with a skin lesion<br>**AND**<br>*C. diphtheriae* or *C. ulcerans* or *C. pseudotuberculosis* has been isolated from relevant specimens but toxigenicity status has not been confirmed. |
| **Confirmed case** | Any person with signs and symptoms consistent with diphtheria (respiratory and/or cutaneous)<br>**AND**<br>a positive culture for or PCR detection of *C. diphtheriae* or *C. ulcerans* or *C. pseudotuberculosis* from a clinical specimen which is confirmed to be tox gene positive by PCR or toxin-producing by ELEK testing. |

## References

1. Clinical and Laboratory Standards Institute. Methods for Antimicrobial dilution and disk susceptibility testing of infrequently isolated or fastidious bacteria, M45 3rd Edition. 2015.
2. EUCAST. Antimicrobial susceptibility testing: EUCAST disk diffusion method. Version 11.0. 2023. http://www.eucast.org/ast_of_bacteria/ disk_diffusion_methodology/