



## Letter to the Editor

## Breaking the challenges to prevent diphtheria in South Africa

Dear Editor

Diphtheria, characterized by a high case fatality rate, is caused by three toxigenic bacterial strains: primarily *Corynebacterium diphtheriae*, and occasionally *Corynebacterium ulcerans* and *Corynebacterium pseudotuberculosis*. In the pre-vaccination era, diphtheria was widespread, predominantly affecting children under 15 years old [1]. While humans serve as the primary hosts for the bacteria, *C. ulcerans* and *C. pseudotuberculosis* can also be found in pet animals [1]. Immunocompromised and unvaccinated individuals are at higher risk of contracting the disease [2]. Diagnosis often involves isolating strains of the diphtheria-causing bacteria. Diphtheria manifests in two primary forms: respiratory and cutaneous [2]. Respiratory diphtheria symptoms might initially resemble a common cold but can progress to include mild fever, sore throat, difficulty swallowing, and inflammation around the tonsils and oropharynx [2]. After a few days, it can lead to upper airway obstruction, resulting in acute respiratory distress. Conversely, cutaneous diphtheria arises from pre-existing wounds, forming painful ulcers that resist healing [2]. Risk factors include poor living conditions, exposure to infected individuals, and inadequate hygiene and sanitation [2]. Transmission occurs through direct contact, inhalation of respiratory droplets, or contact with skin lesions of infected individuals. Repeated exposure to these can compromise immunity, even among vaccinated persons [2]. This article aims to break down some of the challenges that prevent diphtheria in South Africa.

Over the years, South Africa reported only ten cases of diphtheria between 2000 and 2015, with a significant increase to 15 cases reported in KwaZulu-Natal Province in 2015 [3]. Unfortunately, recently in 2023, two cases were confirmed again in KwaZulu-Natal, and up to nine cases emerged in the Pollsmoor Correctional Centre, Western Cape Province [3,4]. The recent outbreaks of diphtheria in South Africa are a public health problem. Several challenges, including the impact of COVID-19, unvaccinated individuals, or those missing vaccine boosters, have been identified [3,5]. For example, inadequate booster vaccination was observed in KwaZulu-Natal, where the disease resurfaced, coupled with reported shortages of vaccine supply [3]. The province's low living standards, high child mortality rates, and significant HIV prevalence likely contributed to the resurgence of the disease [3]. The global impact of COVID-19 disrupted the trend of diphtheria vaccination worldwide, including in South Africa, potentially fueling the resurgence of the disease in various regions [5]. This decline likely played a significant role in the re-emergence of diphtheria in specific areas across the country. The South African government has undertaken several measures to prevent the disease's reemergence, including the administration of diphtheria vaccines at no cost as part of the Expanded Programme on Immunization (EPI) for children at ages 6, 10, 14 weeks, and 18 months, with additional boosters provided at ages 6 and 12 [3]. Current efforts involve prompt isolation of cases and their contacts, intensified vaccination

drives in affected provinces, and administering booster shots to adults [3].

Prevention of diphtheria necessitates robust vaccination efforts and vigilant monitoring of vaccination programs nationwide [5]. Prioritizing the vaccination of school children proves highly effective in achieving comprehensive coverage [5]. Administering vaccine boosters to adolescents at least twice can further fortify immunity against diphtheria. South African government needs to provide an adequate number of vaccines and booster vaccines and actively raise awareness about diphtheria, emphasizing the crucial role of good hygiene and sanitation in the country, especially in areas with low awareness and vaccination coverage. South African government should also collaborate with non-governmental organizations (NGOs) that could amplify these awareness campaigns. Timely hospital visits upon exhibiting diphtheria symptoms, including equipped primary healthcare centers for accurate diagnosis and prompt treatment, have been proven to be effective in diphtheria control [5].

Indeed, preventing the resurgence of diphtheria in South Africa demands a collaborative, multidisciplinary effort. Government bodies, NGOs, healthcare professionals, religious and community leaders, as well as educators in South Africa need to unite to ensure comprehensive vaccination coverage for children, emphasizing the importance of completing the vaccination regimen. Health authorities in South Africa need to prioritize advocacy for the completion of the diphtheria vaccine series, highlighting the disease's fatality rate to underscore the urgency of vaccine uptake in South Africa. Furthermore, the South African government must ensure the widespread availability of diphtheria antitoxin across all healthcare facilities, especially at all primary healthcare centers (PHCs). Research has proven that prompt administration of diphtheria antitoxin upon confirmed cases can significantly reduce mortality rates [5]. Ensuring access to the antitoxin for individuals in contact with affected persons, including healthcare workers, is crucial. Additionally, the South African government must improve the standard of living in regions like KwaZulu-Natal, known for diphtheria infections. Moreover, the South African government should enhance housing, healthcare infrastructure, and overall living conditions nationwide to mitigate significant risk factors associated with diphtheria in the country.

**Table 1.** SUMMARY OF THE CHALLENGES AND POSSIBLE SOLUTIONS TO MITIGATE DIPHTHERIA IN SOUTH AFRICA, 2023. See the Table below.

In essence, diphtheria, a vaccine-preventable disease (VPD), requires proactive steps for prevention. All hands must be on the desk to break the barriers, especially through extensive awareness campaigns and mass vaccination efforts, to reduce the high case fatality rate in South Africa.

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**Table 1**

Summary of the challenges and possible solutions to mitigate diphtheria in South Africa, 2023.

Challenges	Possible Solutions
Inadequate Booster Vaccination:	South African government should provide a sufficient number of vaccines and booster vaccines.
Low standards of living:	South African government should enhance housing, healthcare infrastructure, and overall living conditions nationwide.
High case fatality rate and rapid spread of the disease:	South African government must ensure the widespread availability of diphtheria antitoxin across all healthcare facilities and improve healthcare infrastructure for the rapid diagnosis and treatment of the disease.
Incomplete uptake of vaccine dosage:	Government bodies, NGOs, healthcare professionals, religious and community leaders, as well as educators in South Africa should unite to create awareness on the importance of completing the vaccination regimen.

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### Guarantor

Malik Olatunde Oduoye, College of Medical Sciences, Ahmadu Bello University Teaching Hospital, Kaduna State, Nigeria. [malikolatunde36@gmail.com](mailto:malikolatunde36@gmail.com)

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### CRediT authorship contribution statement

**Umulkhairah Onyioza Arama:** Data curation, Investigation, Validation, Visualization, Writing – original draft. **Malik Olatunde Oduoye:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – review & editing.

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### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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### List of Abbreviations

- (EPI) Expanded Programme on Immunization  
 (NGOs) Non-Governmental Organizations  
 (PHCs) Primary Healthcare Centers (PHCs)  
 (VPD) Vaccine-Preventable Disease (VPD)

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Umulkhairah Onyioza Arama  
 Ahmadu Bello University, Zaria, Kaduna State, Nigeria  
 E-mail address: [umularama@gmail.com](mailto:umularama@gmail.com).

Malik Olatunde Oduoye\*  
 Department of Research, Medical Research Circle (MedReC), Bukavu, DR, Congo

\* Corresponding author. Department of Research, Medical Research Circle (MedReC), Bukavu, DR, Congo.  
 E-mail address: [malikolatunde36@gmail.com](mailto:malikolatunde36@gmail.com) (M.O. Oduoye).  
 Handling Editor: Patricia Schlegelhauf