

## OPINION EDITORIAL

# Challenges and Recommendations to Reducing Burden of Diphtheria in Refugee Camps

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## BACKGROUND

As of 2019, 70.8 million people have been forcibly displaced and 25.9 million refugees exist globally [1]. Displacement of a multitude of people from their homes, destruction of infrastructure, and deterioration of health services result from political and economic instability and civil conflicts [2]. Humanitarian efforts that typically involve setting up refugee camps, temporarily provide necessities such as food, shelter, and medical treatment [1]. However, at a rate of one person forcibly displaced every two seconds, refugee camps are overcrowded, poorly ventilated, and limited in their ability to provide adequate access to healthcare. Infectious diseases, such as diphtheria, can thrive at these refugee camps and lead to outbreaks [3-5].

Throughout history, diphtheria has been one of the most feared infectious diseases, causing devastating epidemics [6,7]. Diphtheria was thought to be a disease of the past since a vaccination, diphtheria-purified tetanus-pertussis (DTP), diagnostic tools such as immunochromatographic strip (ICS), and Diphtheria Antitoxin Treatments (DAT) have become commonplace [8-11]. Diphtheria is transmitted through contact of the gram-positive *Corynebacterium diphtheriae* bacterium in respiratory droplets, resulting in weakness, fever, swollen lymph nodes, and death via obstruction and paralysis [12,13]. Unvaccinated adults and children are most vulnerable, as is the case with incomplete health records of refugees [6,7,14].

Diphtheria, has recently re-emerged and spread

rapidly among refugee populations. Cases have been reported worldwide in areas of political instability where unvaccinated individuals tend to decrease herd immunity [12,15]. For example, the Cox Bazaar Refugee Camp in Bangladesh has a population of 914, 998 refugees. A total of 9,037 diphtheria cases (323 confirmed, 2780 probable and 5927 suspected cases) were reported between November 2017 and February 2020 in the camp, with 46 deaths [16].

Preventable infectious disease outbreaks should not be recurring in this way, and countries should be seizing the the potential to eradicate them. Studying the challenges associated with this particular outbreak may guide recommendations to understand barriers to reducing diphtheria burden. Furthermore, in order to promote the human right of good health and wellbeing for all (Sustainable Development Goal 3), it is important to explore diphtheria outbreaks in refugee camps [14]. The purpose of this paper is to: (1) Address the challenges of preventing, diagnosing, treating, and accessing care for diphtheria outbreaks; and (2) Provide recommendations to decrease the global burden of diphtheria in refugee camps, such as by increasing political commitment (PC) and education in host countries.

## CHALLENGES

Challenges of reducing the burden of diphtheria are explored with respect to the prevention, diagnosis, treatment, and care services at the individual, community and national levels (see Table 1).

**Table 1.** Summary Points of the Challenges and Recommendations.

<b>Challenges</b>	1. Lack of PC - Cost - Access to health services and resources 2. Lack of knowledge & awareness
<b>Recommendations</b>	1. Increase PC 2. Education

### 1. Lack of Political Commitment (PC)

A lack of PC from the host country government of the refugee camp at the national level affects the cost and access to health services.

*Cost:* In preventative terms, diphtheria vaccinations are expensive. Since treatment with DAT is made from human plasma, it is also very costly to both the individual and to the healthcare system. The cost of treatment is also a barrier to reducing the burden of Diphtheria. This is particularly problematic for developing countries that are unable to afford DAT, as they host the majority of the world's refugee camps [17].

*Access to Health Services and Resources:* Access to preventative, diagnostic, and curative services is also a challenge at the individual and community level. The challenge lies in the lack of vaccination posts, a lack of hygiene, and insufficient infrastructure, such as medical clinics, plumbing, and clean water [3,18]. Access to stable power and temperature is important for the storage of vaccinations, diagnostic testing, and treatment [19]. There is a lack of broad coverage because those who most need immunizations are in fragile and difficult to reach environments [3,18]. Additionally, there is a lack of access to ideal diagnostic tools in the community. In low-resource settings, a microscopy examination – insufficient to diagnose diphtheria in diagnosis and treatment [20]. Since most people in a clinical setting – may be the only method available to the clinician [9,20]. Finally, another barrier includes the lack of access to DAT in many countries. DAT is low in supply and unavailable to patients in low-resource settings due to the hindrance of production, low economic viability, and

strict regulatory and manufacturing requirements for blood products [9].

### 2. Lack of Knowledge and Awareness

Barriers to prevention includes vaccine hesitancy, which decreases herd immunity, leaving the overall population at a higher risk for outbreak propagation [3,18]. Additionally, disease rarity is another barrier to diagnosis and treatment [20]. Since most people in the 1940-1980s were immune to diphtheria, it is viewed as low-priority and the “almost forgotten disease” to many clinicians internationally [6,17]. Individually, disease rarity can lead to delayed diagnosis and treatment, increasing the severity of the illness and resulting in increased mortality [21,22].

## RECOMMENDATIONS

Many of the challenges mentioned are interlinked, and therefore recommendations for an effective response are to (1) Increase PC to diphtheria reduction via health system strengthening (HSS) and (2) Education (see Table 1).

Advocacy should be implored to increase the PC to reduce the diphtheria burden in refugee camps. Hosting countries can increase their PC through partnerships with stakeholders such as government officials, non-governmental organizations, and the WHO to ensure HSS [23-25]. Organizations like the Alliance in Vaccines (GAVI), founded by WHO, Centers for Disease Control and Prevention (CDC), and the World Bank are committed to improving the rates of vaccination and strengthening the immunization systems [26]. GAVI-initiative, Expanded Program on Immunization (EPI), focuses on a supply system that transports DTP vaccines to low-resource settings. Though there is progress in the EPI, GAVI aims for an even broader coverage of the vaccinations, which is possible if there is PC [3,18,27].

EPI is also cost-effective and greatly reduces the financial burden of DTP vaccinations on individuals [26]. If PC in hosting countries increased, then access to DAT and other less-costly treatments such

as monoclonal antibodies could increase as well [9,28]. PC could ensure HSS efforts increase DAT stockpiling, and involve community health workers, helping low-resource refugee camps prepare for diphtheria outbreaks [12]. International partners could also donate doses of DAT to developing countries [17]. Finally, timely diagnosis is vital for diphtheria. HSS would ensure that there is access to accurate diagnostics, ideal for low-resource settings, including ICS [12].

Additionally, ongoing education and training of health workers could address the lack of knowledge and awareness of diphtheria among healthcare providers and the people in these camps [25,26,29]. Education in the form of stakeholder dialogue or community interventions could address vaccine hesitancy, lack of awareness, and thus, expedite diagnosis [24]. It is important to practice cultural humility when participating in awareness campaigns, specifically to work with the community in understanding the benefits [30]. Continuing education is something the healthcare professionals could participate in to address disease rarity [26,29].

## CONCLUSION

Reducing the burden of diphtheria at refugee camps is complex and multi-faceted. Two key opportunities to address this exist: (1) Pressuring the government in host countries to increase their commitment to addressing diphtheria outbreaks. This is needed to facilitate HSS via international partnerships, which would increase access to much needed resources at these camps. Execution of PC plans are imperative. (2) Education and training to address reluctance and lack of awareness or knowledge about diphtheria outbreaks. Important to acknowledge, is that the necessary resources exist to combat diphtheria, and with continued efforts and collective action, eradication of diphtheria in refugee camps will be made possible.

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