https://doi.org/10.1038/s41564-022-01285-8

Migrant health matters

Reports of diphtheria cases in asylum seekers in the UK remind us that understanding and mitigating the risks posed by infectious diseases to disadvantaged peoples remain important.

Before the advent of vaccination against diphtheria in the UK in 1942, cases of this feared disease numbered around 60,000 per year with around 4,000 deaths. Diphtheria is mainly caused by *Corynebacterium diphtheriae* and *Corynebacterium ulcerans*, both of which produce diphtheria toxin, and can be transmitted via respiratory droplets and close contact. Diphtheria toxin rapidly kills cells, and those dead cells form a greyish-black pseudomembrane that coats the tonsils, throat and nose, making breathing difficult. Known as the strangling angel of children in Victorian times, diphtheria recently resurfaced in a migrant processing centre[1] in Manston, Ramsgate, in the UK. Diphtheria is now so rare (for example, there were less than 10 cases in 2021 (ref. [2]), with several cases caused either by *C. ulcerans* caught from farm animals or occurring in those who missed out on routine boosters) that the small number of cases reported in the centre made the headlines.

Manston is home to a migrant processing centre, in which migrants who have left their homes for reasons including fleeing war, persecution or conflict, and have entered the UK on small boats, are subject to security and identity checks before being moved out of the centre and into hotels. Manston recently became overcrowded, with four times the maximum number of people who should be accommodated being squeezed together in cramped conditions. Whatever the political issues surrounding immigration, it is incumbent on governments to operate within the law (which in this case states that people should not remain in this centre for more than 24 hours) and to treat migrants respectfully, including safeguarding women and children. According to legal action, started by the charity Detention Action on behalf of one of the detained immigrant women, overcrowding and poor sanitation at Manston have led to deteriorating health conditions that have been described as inhumane and in violation of UK laws. These dangerous conditions have resulted in outbreaks of infectious diseases including diphtheria.

The broader issue that these diphtheria cases in the UK raises is that the conditions facing asylum seekers in their home countries may preclude routine vaccinations and adequate healthcare. Migrants are therefore particularly vulnerable to infectious diseases, and countries that they flee to in search of a better life must take specific, evidence-based measures to ensure the health of people who have come into their care.

Sadly, serious infectious disease outbreaks, notably diphtheria, in migrant communities are not new. For example, the movement of more than 700,000 Rohingya refugees[3] to overcrowded camps in Cox's Bazar, Bangladesh, in 2017 resulted in a large outbreak of diphtheria (7,064 cases and 45 deaths) that lasted for more than 2 years. The outbreak was eventually brought under control by a combination of antibiotic therapy and rounds of mass vaccination. A retrospective analysis by a team from the World Health Organization found that ineffective diagnostics, lack of sufficient availability of vaccines, and limited use of antibiotics contributed to the outbreak lasting for such a long time[3]. The authors concluded that "crisis-affected populations must have access to health services, including routine vaccination"[3]. The resurgence of diphtheria, a preventable disease, in displaced peoples in any high-income country throws into sharp relief the global inequalities and the failures of developed nations to assist those in need, and calls attention to the potential for preventable diseases to continue to cause illness and death. The spread of infectious diseases, which can cause established outbreaks, as happened in the Rohingya refugees, further highlights the need for diagnostics, epidemiology studies and incorporation of One Health approaches into public health microbiology.

According to the office of the high commissioner for human rights, more than 280 million people worldwide are migrants, many of whom have been forced to live outside their country of origin by persecution or conflict. Of note, there are ongoing conflicts in Afghanistan, Ethiopia, Yemen, Somalia and Ukraine, which have led to migration. Back in 2007, the European Academies' Science Advisory Council reported that while most migrants to the European Union are healthy, in terms of proportion of their population, migrants may bear a disproportionate burden of infectious disease, and this is borne out by other recent outbreaks around Europe. More recently, in October 2022, an increase in diphtheria was noted by the European Centre for Disease Prevention and Control with 92 cases in 7 European countries[4]. Most cases were in reception centres for migrants. Two diphtheria outbreaks have also been detected in a Swiss asylum centre between July and September 2022, with the second outbreak still ongoing in November, at the time of publication[5]. Evaluation of travel routes showed that while some people were infected in the asylum centre, most were infected during migration to Switzerland. Of concern, two of the *C. diphtheriae* isolates from the Swiss outbreaks had broad resistance to many common oral and parenteral antibiotics. This speaks to a need to monitor for antimicrobial resistant organisms as well as key pathogens in this vulnerable group.

Certainly, migrants deserve better. Migrants are vulnerable for many reasons, not least because of disruption to routine vaccination during conflicts, which is one reason for infectious disease outbreaks among many refugees from Afghanistan. The European Centre for Disease Prevention and Control[6] has advocated for "equity of access to vaccination against priority diseases such as diphtheria, poliomyelitis and measles, particularly for vulnerable population groups such as migrants, refugees and asylum seekers". However, more needs to be done to reach these goals and prevent future infectious disease outbreaks in this most vulnerable of groups.

Options recommended by the European Centre for Disease Prevention and Control include checking diphtheria vaccination status of migrants on arrival, providing diphtheria vaccination, specific training of clinicians about the potential for diphtheria in displaced people to ensure timely diagnoses, and checking that all personnel at migrant centres are vaccinated.

Infectious diseases, be they newly emergent pandemic viruses, the ongoing global monkeypox outbreak[7] or old foes such as diphtheria, are an important part of our scope. At *Nature Microbiology*, we will continue to expand our

coverage of infectious diseases, public health microbiology, epidemiology and One Health. Addressing the burden of infectious diseases worldwide requires concerted and continuing attention, from funders and basic researchers, to clinicians and policy makers.

Migration is only likely to increase[8] in coming years, owing to climate change. The United Nations International Organization for Migration has cited estimates of as many as 1 billion environmental migrants in the next 30 years. Understanding the emergence and spread of infectious diseases during a time of rapid climatic change and political upheaval is of paramount importance if we are to ensure the health of the global population.

Published online: 28 November 2022

References

1. Taylor, D. Diphtheria outbreak confirmed at asylum seeker centre in Kent. *The Guardian* (20 October 2022); https://go.nature.com/3fUGtBZ
2. *Diphtheria in England: 2021* (UK Health Security Agency, 2022); https://go.nature.com/3DWw1lu
3. Polonsky, J. A. et al. *PLoS Med.* **18**, e1003587 (2021).
4. *Increase of Reported Diphtheria Cases Among Migrants in Europe due to Corynebacterium diphtheriae, 2022* (European Centre for Disease Prevention and Control, 2022); https://go.nature.com/3FW9tnl
5. Kofler, J. et al. *Eurosurveillance* **27**, 2200811 (2022).
6. *Increased Diphtheria Cases in Migrant Reception Centres in Europe* (European Centre for Disease Prevention and Control, 2022); https://go.nature.com/3DT0f98
7. Wenham, C. & Eccleston-Turner, M. *Lancet* https://doi.org/10.1016/S0140-6736(22)01437-4 (2022).
8. *Report on the Impact of Climate Change on Migration (October 2021)* (Government of the United States of America, 2021); https://go.nature.com/3FX5k2R