## BEYOND OUR BORDERS

**The 'Beyond our Borders' column focuses on selected and current international diseases that may affect South Africans travelling abroad. Numbers correspond to Figure 2 on page 10.**

# Plague: Democratic Republic of Congo

The Democratic Republic of Congo (DRC) has reported 15 cases of bubonic plague in the north-eastern province of Ituri since April 2021. Of these, 10 cases have demised. While Ituri is considered endemic for the disease, 2020 saw a total of 420 cases compared to the 48 cases reported in the DRC in 2019 and 133 in 2018. The recent outbreak was detected following investigations of the death of five family members who all had similar clinical presentations.

Historically, plague is known to have caused three major pandemics across Asia, Europe and Africa over the past 1 500 years. Prior to the discovery of antibiotics and an understanding of infection prevention, transmission of the disease was rapid and had a high mortality rate, killing over 150 million people. While plague is now detected in many parts of the world, the most endemic countries are the DRC, Madagascar and Peru.

*Yersinia pestis,* the causative agent of plague, is found most commonly in rodents. Transmission to mammals, including humans, are primarily vector-borne through fleas, but may also occur through direct contact or airborne routes of transmission.

The three most common clinical manifestations of plague are, in order of increasing severity: bubonic, septicaemic and pneumonic. While one form of plague may complicate into the next, each manifestation may also be the primary presentation of the different modes of transmission. General symptoms common to all manifestations include a fever, headache and generalised weakness. Bubonic plague, contracted through flea bites, present with swollen, painful lymph nodes that may become suppurating open sores. Septicaemic plague may also be acquired through flea bites or through contact with infected animals. This form of plague presents with signs of haemorrhage, which may lead to shock. Pneumonic plague is contracted through inhalation of respiratory droplets or aerosolised bacteria. Patients present with pneumonia – with cough, shortness of breath and chest pain – and may complicate to develop respiratory failure. Pneumonic plague can spread from person to person through respiratory droplets. All forms of plague are treatable with supportive care and prompt antibiotic therapy.

Prevention strategies to reduce transmission, morbidity and mortality among humans include flea control, rodent control, early detection, isolation and medical management of cases, quarantine of contacts and chemoprophylaxis, and surveillance with a multi-sectoral outbreak response.

In South Africa, plague has not been seen in humans since 1982. Prevention strategies are guided by the National Plague Control Guidelines. Surveillance activities to detect and guide our response to plague include the rodent surveillance programmes in the Nelson Mandela Bay, eThekwini and Johannesburg municipalities, and the notifiable medical conditions system.

# Anthrax: Uganda

Human cases of anthrax have been reported in Uganda. Since mid-April 2021, 15 people have been infected and one has died in Uganda's eastern district of Kween. Transmission is thought to have occurred after people had eaten the meat of an infected cow.

Anthrax is an acute infectious disease caused by the spore-producing bacterium *Bacillus anthracis*. Anthrax spores may last for decades in soil and infect animals – particularly cows, sheep, goats and buck – through inhalation or ingestion. Transmission to humans from infected animals occurs through direct contact with the living or dead animal or animal products (including wool, skin, etc.) where spores enter broken skin; ingestion of the meat of an infected animal; or inhalation of anthrax spores. Human to human transmission has not been identified.

Clinically, four major manifestations are seen. These are related to the body system that makes contact with the spores during infection. Cutaneous anthrax presents with typical skin lesions – small, itchy, raised lesions that swell, then turn black; gastrointestinal anthrax causes nausea, vomiting, abdominal pain and eventually bloody diarrhoea; inhalation anthrax can have an incubation up to two months and presents with a cough, shortness of breath and chest discomfort; and injection anthrax, described recently in injection-drug users, causes lesions beneath the skin that may manifest as an abscess. All manifestations may be fatal if not treated. Inhalation anthrax is the most dangerous, with only around a 50% chance of survival even once treated with antibiotics.

In 2001, anthrax was used in a case of bioterrorism in the United States of America where 17 people were infected and five died following exposure to the agent through intentionally contaminated letters. While South Africa has had no real threat of anthrax through bioterrorism, several 'white powder threats' have been investigated in the country.

The most effective strategy to prevent human morbidity and mortality from anthrax is through animal vaccination. In addition, surveillance to detect animal and human cases to guide an appropriate outbreak response are of utmost importance.

BEYOND OUR BORDERS

# Diphtheria: Dominican Republic

The Dominican Republic has reported 12 cases of diphtheria with nine deaths. This follows three cases reported in 2020 and no cases in 2019 and 2018. Diphtheria cases are rare and occur sporadically as a result of poor vaccination coverage. Vaccination campaigns and coverage have been negatively affected in the country due to the COVID-19 outbreak; however, full diphtheria coverage in 2019 was 83%.

Diphtheria is caused by *Corynebacterium diphtheriae,* a toxin-producing bacterium that results in primarily respiratory and skin diseases. Less commonly, the disease may also be attributed to *C. ulcerans* or *C. pseudotuberculosis*. Transmission of the agent is through respiratory droplets and through direct contact with infected skin lesions. Clinical disease is most often due to the toxin produced by the bacteria.

The most common clinical manifestations of diphtheria are an upper respiratory and a cutaneous disease. Respiratory symptoms are initially mild – sore throat, cervical lymphadenopathy and a fever and malaise – but may also include swelling of the pharyngeal area that obstructs breathing. A characteristic adherent pseudomembrane – a white, grey or even green or black thin mass – over the tonsils, pharynx, soft palate or nose is also often present and should trigger further investigation. Cutaneous lesions are initially vesicular, then develop ulcers covered by an eschar, usually over the hands, lower legs and feet. Systemic complications include myocarditis and local neuropathies. Treatment must include supportive, antibiotic and antitoxin therapy.

Primary prevention of diphtheria is through the diphtheria toxoid vaccine. Four doses are required for optimum protection against infection and severe disease. Infection prevention and control strategies at healthcare facilities prevent spread from an index patient, and should be complemented by contact tracing for chemoprophylaxis as part of an outbreak response. In South Africa, vaccination against diphtheria is part of the expanded programme on immunisation (EPI) and diphtheria is a notifiable medical condition.


**Figure 2.** Current outbreaks/events that may have implications for travellers. Numbers correspond to text above. The red dot is the approximate location of the outbreak or event.

**Source: Promed (www.promed.org), World Health Organization (www.who.int), Centres for Disease Control and Prevention (www.cdc.gov), Journal of Military and Veterans' Health (jmvh.org), World Organisation for Animal Health (oie.int), Federal Bureau of Investigation (fbi.gov), National Institute for Communicable Diseases (nicd.ac.za); Division of Public Health Surveillance and Response, NICD-NHLS; outbreak@nicd.ac.za**