Dengue

Dengue is an infection caused by the dengue virus of which there are four different subtypes. The disease is transmitted by mosquitoes

Key messages

- **Dengue is a viral disease spread by mosquitoes which predominantly feed during daytime hours.**
- **Most people with dengue do not develop symptoms. When symptoms do occur, they can include high fever, muscle and joint pains, headache, nausea, vomiting and rash.**
- **Most infections are self-limiting with improvement in symptoms and recovery occurring three to four days after the onset of the rash.**
- **Severe dengue is a more serious form of the disease which is rare in travellers.**
- **The number of reported cases of dengue in UK travellers has been increasing; most cases are acquired in Asia, Central and South America and the Caribbean.**
- **Travellers should avoid mosquito bites. A vaccine is available in the UK.**

Overview

Dengue is caused by a virus of the genus *Flavivirus*, within the family *Flaviviridae*. It is spread by the bite of an infected *Aedes* spp. mosquito, which predominantly feed during daytime hours.

There are four distinct serotypes of dengue virus: DENV-1, DENV-2, DENV-3 and DENV-4. All have the potential to cause severe dengue, formerly known as dengue haemorrhagic fever (DHF). Severe dengue is more likely if a person has had a previous dengue infection.

According to the World Health Organization (WHO), the number of dengue cases reported worldwide has grown dramatically in recent decades. In 2000, there were 505,430 dengue cases reported to WHO, compared with 5.2 million in 2019 [1]. Factors associated with increasing risk of

spread of dengue epidemic include climate change leading to increasing temperatures, high rainfall and humidity [2]. Other factors include the increased movement of people and goods, urbanisation and pressure on water and sanitation [3].

Under reporting, misclassification of disease and the practice of reporting confirmed cases only, means the global burden of disease is likely to be far greater: approximately half of the world's population is at risk, and it is therefore estimated that the likely incidence of disease is between 100-400 million infections each year [1].

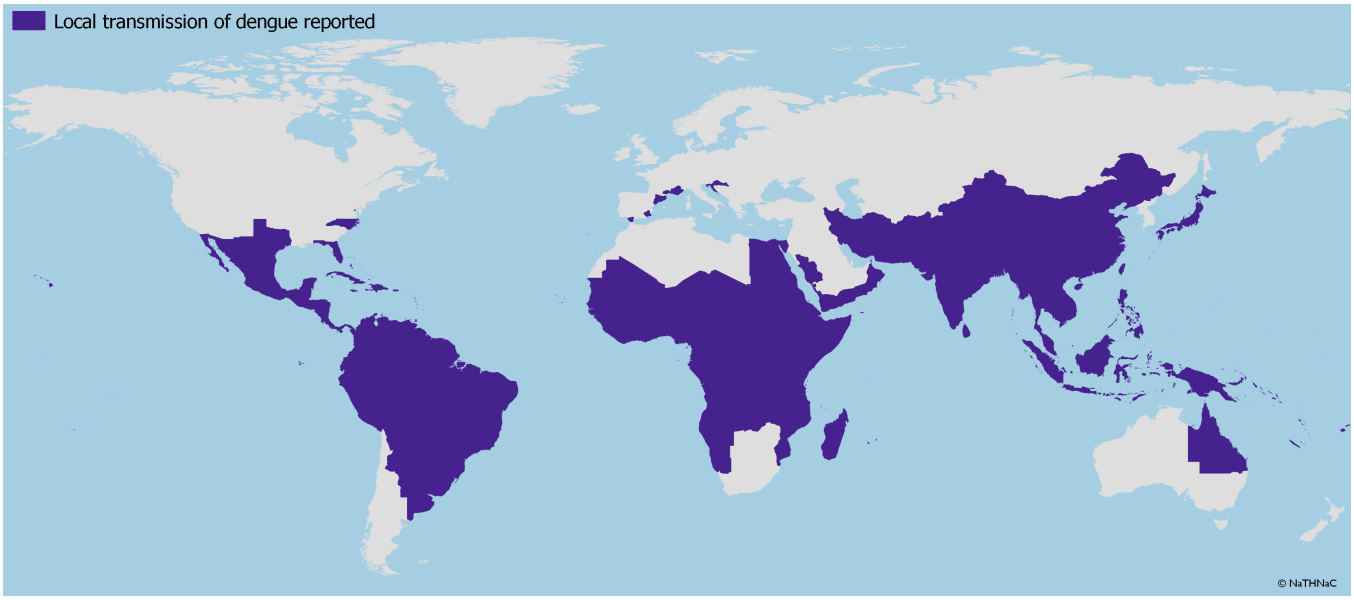
Risk areas

Dengue occurs in tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas. Dengue is endemic in more than 100 countries in Africa, the Americas, the Eastern Mediterranean, Southeast Asia and the Western Pacific, with Asia accounting for 70% of the global burden of disease [1].

Outbreaks of dengue are under-reported in Africa due to limited laboratory capacity and less well-developed dengue surveillance systems. However, the presence of the disease and the high prevalence of antibodies to dengue viruses in serological (blood test) surveys in local populations suggest that dengue virus infection is endemic in many parts of the continent [4].

Increasing global temperatures aid the wider geographic distribution of some species of *Aedes* mosquitoes. Temperate regions are therefore increasingly at risk of becoming endemic for dengue. Dengue-infected travellers returning from endemic areas can generate local outbreaks in areas where there are suitable mosquito vectors, even if dengue is not usually found in that region.

Dengue, countries or areas at risk, 2021



Schematic map illustrating where local transmission of dengue has been reported. Please see individual Country Information pages for up-to-date country details.

Dengue is now an emerging disease outside tropical areas, including parts of Europe [5]. Since 2010, several outbreaks have been reported in Europe in Croatia, France, Italy and Spain [6].

From September 2012 to March 2013, the autonomous Portuguese island of Madeira reported its first dengue outbreak, with 2,168 probable and 1,080 confirmed cases. Imported cases associated with this outbreak were also detected in travellers returning from Madeira to other countries in Europe, including the UK [7, 8].

Risk for travellers

The likelihood of contracting dengue is determined by several factors, including destination, length of exposure, intensity of transmission and season of travel. [9, 10]. Risk is thought to be higher during periods of intense mosquito feeding activity (two to three hours after dawn and during the early evening).

All travellers to dengue endemic countries are at risk, although determining individual risk is difficult. True dengue incidence in travellers is probably underestimated as in many countries dengue reporting is not obligatory. Also, due to non-specific symptoms, dengue is probably under-diagnosed [11].

Travellers who spend long periods in endemic areas (such as expatriates or aid workers) are at increased risk. However, even short-term visitors may be exposed [11-13].

Severe dengue is rare in travellers [14]. Individuals who are infected for the second time with dengue are at greater risk developing severe illness [1]. Severe dengue is also more common in children, adolescents, and pregnant women. An increased risk of severe disease has also been described in older individuals and those with comorbidities such as diabetes, chronic renal failure, obesity, and bleeding disorders [15].

Dengue in UK travellers

Dengue does not occur naturally in the United Kingdom (UK) and it is a travel-associated infection. Most cases reported in returning UK travellers are acquired in Asia, Central and South America or the Caribbean. In 2023, a total of 634 cases of dengue (576 confirmed and 58 probable cases) were reported in England, Wales and Northern Ireland [14].

Information on dengue is available from UK Health Security Agency (UKHSA): laboratory confirmed cases reported in England Wales and Northern Ireland.

Transmission

Dengue is transmitted (spread) from human to human by different species of *Aedes* mosquito. Rarely blood-borne person to person transmission has been reported and pregnant women can pass the infection to their babies at the time of delivery [15]. Reports of sexual transmission are very rare [15, 16].

Aedes aegypti is considered the most efficient mosquito vector associated with dengue transmission and is closely associated with humans and their dwellings. *A. aegypti* mosquitoes breed in water containers (including buckets used to collect rainwater, cisterns, toilets and tyres) and rest inside in cool, dark rooms. In forests, they breed in water-filled tree holes [17]. They are most active during daylight hours, when they feed from dawn to dusk, but can bite at night in well-lit areas. *A. aegypti* requires higher, more tropical temperatures to survive.

Aedes albopictus mosquitoes also spread dengue [15]. Globally these mosquitoes are present in many areas including a number of European countries and are the vector most involved in spread of dengue in Europe [18]. *A. albopictus* is a relatively hardy species and can survive in cooler, more temperate climates.

Signs and symptoms

Approximately 40 to 80 percent of people infected with dengue have no symptoms [18]. When symptoms occur, illness begins abruptly after an incubation period of five to eight days. There may be high fever (up to 40°C), often accompanied by a severe headache and retro orbital (behind the eye) pain, muscle and joint pains, nausea, vomiting, abdominal pain and anorexia. High temperature can persist for two to seven days [18]. Around the third to fourth day, a maculopapular skin rash may be seen on the chest, trunk and extremities [15].

Health professionals should be alert to the warning signs of severe disease, which include easy bruising, bleeding in the gums or eyes, severe abdominal pain, liver enlargement and evidence of capillary leakage.

Severe dengue is characterised by bleeding, with major organ functions becoming compromised, resulting in respiratory distress, impaired consciousness and renal failure, and may ultimately lead to death [15, 19].

Diagnosis and treatment

The diagnosis of dengue can be confirmed by blood test (serology and viral detection) [20, 21].

There is no specific drug treatment for dengue. Management is supportive, aiming to alleviate symptoms and prevent complications. Most infections are self-limiting, with improvement in symptoms and rapid recovery occurring three to four days after the onset of the rash.

Patients may need to be admitted to hospital, with careful management of fever, fluid balance, electrolytes and blood clotting. Patients with severe disease may need to be admitted to specialist units such as intensive care or high dependencies units. With good supportive care, death due to severe dengue is typically less than one percent [15].

Anti-viral and steroid therapies have not been shown to aid recovery [15].

Long-term immunity to the infecting dengue virus serotype occurs in those who recover. However, infection with one serotype does not confer immunity to the other three serotypes or to other flaviviruses, and subsequent infection with a different dengue serotype may be more severe.

Health professionals should be alert to the possibility of dengue in those who have recently returned from a dengue risk area who present with a fever or flu-like illness [21, 22].

Clinical advice should be sought in the first instance from a local microbiology, virology or infectious disease consultant. Health professionals who suspect dengue should send appropriate samples for testing (with full clinical and travel history) to the UK Health Security Agency Rare and Imported Pathogens Laboratory.

The Imported Fever Service offers infection health professionals a 24-hour, seven day a week telephone access to expert clinical and microbiological advice for patients with suspected travel-associated infections, including dengue.

Preventing dengue

Prevention is by avoidance of mosquito bites. Particular vigilance with bite precautions should be taken around dawn and dusk. Those living in endemic areas should remove rubbish or water containers close to their home where possible as they can be breeding sites for mosquitoes.

Vaccine information

A vaccine, Qdenga®▼ has been licensed in the UK for the prevention of dengue disease in individuals from 4 years of age. The UK Joint Committee on Vaccination and Immunisation (JCVI) has advised that Qdenga®▼ vaccine can be considered for individuals aged 4 years of age and older who have had dengue infection in the past and are:

- Planning to travel to dengue where there is a risk of dengue infection or areas with an ongoing outbreak of dengue.

or

- Exposed to dengue virus through their work, for example, laboratory staff working with the virus.

Guidance on use of Qdenga®▼ is available in the JCVI minutes February 2024.

Qdenga®▼ is a live vaccine (it contains live, attenuated dengue virus) and is contraindicated for anyone who is immunosuppressed, pregnant or breastfeeding. This vaccine is also contraindicated for those with hypersensitivity to any component of the vaccine and for children under four years of age [23].

Another vaccine, Dengvaxia®, is licensed in some countries for use in endemic regions for use in at-risk people aged between 9 and 45 years of age.

Dengvaxia® is not available in the UK. The vaccine has been shown to be efficacious and safe in persons who have had a confirmed previous dengue infection but carries an increased risk of severe dengue in those who experience their first natural dengue infection after vaccination [24], and patients need careful assessment and counselling before vaccination. Blood tests for previous dengue infection may not be 100 percent reliable [24] and assessment must be made of previous tests for dengue and likely exposure and clinical history.

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