

Dengue

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Dengue is one of the most important mosquito-borne diseases.^{1,2} Predominantly an urban disease, mosquitoes that spread the virus are closely associated with human habitation and humans act as the reservoir host. With current estimates of up to 100 million infections each year, there is concern that predicted climate change and continuing urbanisation may result in a continued upward trend in the number of dengue infections worldwide. In Australia, locally acquired cases of dengue occur only in far north Queensland where populations of vector mosquitoes are present. Annual activity has occurred in the region since the 1980s with the largest Australian epidemic in 50 years occurring in 2009 when approximately 1000 cases were reported.³

Dengue viruses

Dengue fever and its more serious form, dengue haemorrhagic fever, are caused by one of four closely-related viruses. Dengue virus belongs to the family Flaviviridae and infection with one serotype does not provide cross-protective immunity. Infection with dengue viruses produces a spectrum of clinical illness ranging from a non-specific mild febrile illness to severe and potentially fatal dengue haemorrhagic fever. Older children and adults may have a mild febrile syndrome but more typically experience high fever, severe headache, pain behind the eyes, muscle and joint pains and rash. The incubation period ranges from 3 to 14 days.⁴ Once recovered, a person develops immunity to this single serotype. However, upon infection with a different serotype, the person stands a greater risk of developing dengue haemorrhagic fever, characterised by high fever, haemorrhagic phenomena, enlarged liver and circulatory failure. There is no specific treatment or vaccine for dengue fever, but close medical attention and clinical management saves many lives.^{1,4} Without treatment, the average fatality rate for dengue haemorrhagic fever can be as high as 5%.

Vectors

The most important vector of dengue virus globally is *Aedes aegypti*. This species is a very efficient epidemic vector because of its adaptation to water-holding containers found in urban environments, and its preference for feeding on humans. A secondary vector is the Asian tiger mosquito, *Ae. albopictus*, which is also associated with human

activity and has been introduced to many parts of the world over the last 30 years, primarily through international movement of used tyres. The immature stages of both species can be commonly found in water-holding containers. *Ae. albopictus* will often also utilise natural environments (e.g. tree holes). Mosquitoes ingest viruses when feeding on an infective individual. Once infected, a mosquito remains infective for life.⁴

Control

Demographic and societal changes over the past 50 years have contributed to a global resurgence of dengue. Population growth and modern transportation have been forces. Control of mosquito populations remains the key to dengue management. Few new and effective mosquito control methods have been developed in the past 30 years. Reductions in the availability of suitable habitats, chemical use, biological control and changes in human behaviour can all assist in reducing the risk of dengue.

Dengue in New South Wales (NSW)

There have been no records of local activity of *Ae. aegypti* or the dengue virus in NSW since the late 1940s.⁵ While there is debate surrounding the factors contributing to the retreat of *Ae. aegypti* from NSW, there is concern regarding the possible reintroduction of the species into urban areas in light of increasing domestic water storage. In addition, a widespread infestation of *Ae. albopictus* has been documented from the Torres Strait and computer modelling has suggested that there is the potential for this species to become established and widespread in coastal Australia.⁵

References

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