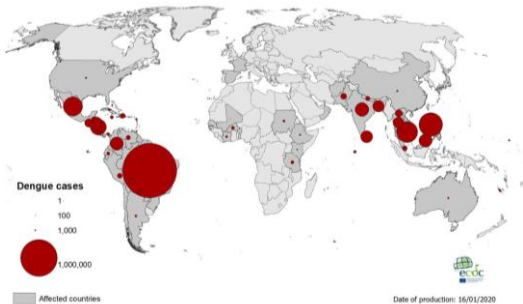




## DENGUE VIRUS

### The disease

- Dengue is a viral disease that is transmitted to people by mosquitoes
- Caused by any one of four closely related dengue viruses (DENV 1, DENV 2, DENV 3 or DENV 4)
- Areas affected extend to most tropical and subtropical countries of Oceania, Asia, the Caribbean, the Americas and parts of Africa
- Countries and territories where dengue fever cases have been reported (as of January, 2020)



- Most cases in South Africa were detected in travellers returning from tropical and sub-tropical countries where the disease is endemic. One outbreak occurred in SA in 1926-27.

### The mosquitoes

- *Aedes* species mosquitoes transmit dengue virus
- These same mosquitoes transmit chikungunya and Zika virus
- These mosquitoes bite mostly during the daytime

### Laboratory investigation

- The laboratory diagnosis of dengue is based primarily on the detection of antibodies by haemagglutination inhibition assay or ELISA in serum
- The detection of IgM antibodies or IgG seroconversion between paired samples which have been taken two weeks apart, indicates recent infection
- IgM antibodies are detectable ~ 1 week after infection and are highest at 2-4 weeks after onset of illness. They remain detectable for ~3 months
- If serum is collected within 8 days of illness onset, the absence of detectable virus-specific IgM does not rule out a diagnosis, and the test may need to be repeated on a later sample
- IgG antibody levels take longer to develop, but remain detectable for years
- Reverse transcription polymerase chain reaction (RT-PCR) and virus isolation from a serum collected early in the course of illness are additional tests that may be useful
- All samples submitted to the laboratory should include a completed case investigation form

### Symptoms

- Dengue fever may occur in various forms
- Leukopenia and thrombocytopenia are common
- Dengue fever (majority of cases):
  - Acute high fever, severe headache, pain behind eyes, body aches and joint pains, nausea/vomiting, characteristic rash (looks like sun burn – example below)



- Dengue haemorrhagic fever (DHF):
  - Symptoms similar to dengue fever **PLUS**
    - Severe and continuous pain in abdomen
    - Bleeding from the nose, mouth, gums or skin bruising
    - Frequent vomiting with or without blood
    - Black stools
    - Excessive thirst (dry mouth)
    - Pale, cold skin
    - Restlessness, or sleepiness
- Dengue shock syndrome (DSS)
  - Dengue haemorrhagic fever **PLUS**
    - Weak rapid pulse
    - Narrow pulse pressure (less than 20mm Hg)
    - Cold, clammy skin and restless

### Illness course and outcomes

- Incubation period of 4-10 days
- Most patients feel better within one week (range 2-7 days)
- 5% of patients will develop severe dengue which can result in death
- If you had dengue in the past, you are more likely to develop severe dengue
- DHF and DSS can occur 3-5 days after fever onset
- Although fever may have subsided, this is the riskiest phase that requires high vigilance from care-givers



## **Prevention**

### **USE INSECT REPELLANT**

- Use DEET-containing insect repellents as directed by the manufacturer
- Reapply during the day as needed

### **WEAR LONG-SLEEVED SHIRTS AND PANTS**

- Consider wearing long-sleeved, loose fitting shirts and pants when outdoors and likely to encounter mosquitoes
- When camping or similar activities consider using permethrin treated gear and clothing

### **KEEP YOUR SURROUNDS MOSQUITO-FREE**

- Screen windows and doors
- Reduce mosquito breeding grounds. Mosquitoes lay eggs in and around water. Minimize the amount of standing water in and around the house – for example pots and other containers that contain stagnant water

## **Treatment and vaccines**

- There is no antiviral medicine to treat dengue fever
- Currently there are one dengue vaccine, Dengvaxia® by Sanofi Pasteur, licenced in 2015, targeted for persons living in endemic areas, ranging from 9-45 years, who have had at least 1 documented dengue virus infection previously
- Many cases require no treatment
- Symptomatic support such as pain and fever relief is often prescribed

## **More information on arboviral disease:**

[www.nicd.ac.za](http://www.nicd.ac.za) under the 'Diseases A-Z' tab

[www.cdc.gov/dengue/index.html](http://www.cdc.gov/dengue/index.html)

[www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue](http://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue)

## **Who should be tested for Dengue?**

Persons presenting with rash (petechiae), fever, headache, ocular pain, nausea/vomiting or arthralgia/myalgia

### **AND**

Who recently (<14 days) travelled to an area with active dengue virus transmission

### **OR**

Persons with past dengue virus infection presenting with warning signs for DHF and DSS as described under "Symptoms"

## **Procedures to follow when submitting specimens for dengue testing to the NICD**

- Collect blood in a red (clotted blood) or yellow top (serum) tube
- Complete arbovirus case investigation form available on [www.nicd.ac.za/diseases-a-z-index/arbovirus/](http://www.nicd.ac.za/diseases-a-z-index/arbovirus/)
- Submit the specimen to the Arbovirus Reference Laboratory, Centre for Emerging Zoonotic and Parasitic Diseases, National Institute for Communicable Diseases for testing
- Samples should be kept cold (on ice packs or cold packs) during transport
- Dengue testing will be done during office hours, for additional information contact the laboratory at 011 386 6424 / 082 903 9131 or [cezd@nicd.ac.za](mailto:cezd@nicd.ac.za)
- Arrange urgent testing with the NICD Hotline 082 883 9920
- Submission of convalescent specimens is highly recommended to facilitate interpretation of serological assays

## **Laboratory testing offered by NICD**

- RT-PCR testing and virus culture (clotted blood/serum) are useful during the transient viraemic stage of infection (<7 days post symptom onset). *A negative RT-PCR / viral culture does not exclude recent infection.*
- Paired serological testing (clotted blood/serum taken up to 14 days apart). A haemagglutination test (HAI) and dengue specific IgM or IgG ELISA is available. Serology is limited by cross-reactivity with other flaviviruses therefore paired serological testing is essential. *Specimens submitted for dengue will also be tested for other arboviruses because of overlapping clinical presentations*
- Serology for dengue virus may not provide conclusive results
- Dengue virus is a category 3 notifiable medical condition ([www.nicd.ac.za/wp-content/uploads/2017/06/SOP-Notifiable-Medical-Conditions\\_-notification-procedures\\_v2Jan2018final-Copy.pdf](http://www.nicd.ac.za/wp-content/uploads/2017/06/SOP-Notifiable-Medical-Conditions_-notification-procedures_v2Jan2018final-Copy.pdf))