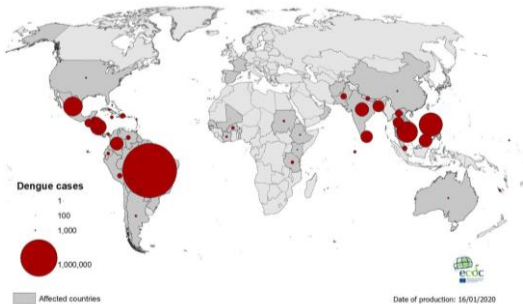




DENGUE VIRUS

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 under the 'Diseases A-Z' tab

www.cdc.gov/dengue/index.html

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/
- 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
- 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)