
Yellow fever

Frequently Asked Questions

1. What is yellow fever?

Yellow fever is a vector-borne acute viral haemorrhagic disease caused by an infection with the Yellow Fever virus (YFV). The YFV is a single-stranded RNA virus in the Flaviviridae family. The virus is transmitted by a bite of an infected mosquito vector.

2. Who can get yellow fever?

In Africa, infants and children are at highest risk for yellow fever because natural immunity in populations increases with age. Unvaccinated travellers to and from yellow fever endemic countries are at high risk of exposure to and being infected with the YFV. Person-to-person transmission of yellow fever does not occur.

3. Where does yellow fever occur in South Africa?

Yellow fever is limited by the distribution of the mosquito vector which is found in subtropical and tropical regions of northern, central, eastern and sub-Saharan Africa and tropical South America, where it is endemic and intermittently epidemic. South Africa has a small risk of disease introduction as the mosquito vector occurs with a limited distribution to northern Limpopo and Northern KwaZulu-Natal.

4. How is yellow fever transmitted?

Vector-borne transmission occurs through the bite of mosquitos of an infected *Aedes aegypti* (the yellow fever mosquito). Nonhuman and human primates are the main reservoirs of the virus, with human-to-vector-to-human transmission occurring. Person-to-person transmission of yellow fever does not occur.

5. How does yellow fever affect animals?

Yellow fever virus can infect monkeys which serve as reservoirs of infection in forested areas.

6. What are the signs and symptoms of yellow fever?

After an incubation period of three to six days the acute phase of the illness begins, presenting with fever, muscle pain, prominent backache, headache, shivers, loss of appetite, nausea and vomiting. After a short period of remission (hours to days) about 15% of patients progress to a more severe phase of illness presenting with jaundice, abdominal pain, vomiting, multiple system failure, shock, renal failure and/or haemorrhage. An estimated 20-50% of cases may have a fatal outcome.

7. How is yellow fever diagnosed?

A diagnosis of yellow fever is suspected based on the patient's clinical presentation, travel history and activities that may have exposed the patient to YFV, especially travel to areas with current outbreaks. The laboratory diagnosis of yellow fever is based on the detection of YFV antigen through PCR and culture. Serologic assays (haeagglutination-inhibition, HAI; and Indirect Fluorescent Antibody, IFA tests) are also done to detect virus specific IgM and IgG antibodies. HAI and virus

isolation (culture) are done routinely by the lab. If the HAI is positive, IgM IFA is also done to determine whether the infection is recent. PCR is only done on request.

The difficulty with yellow fever diagnosis is that IgM can remain positive for over a year following administration of yellow fever vaccine. In such cases, PCR done within the first seven days of illness is the diagnostic modality of choice. Another difficulty with yellow fever diagnosis is the cross-reactivity between antibodies raised against other flaviviruses such as dengue or Zika virus. For this, more specific antibody testing, such as neutralisation assay should be done to confirm infection.

Clotted blood or serum should be collected (red top tubes or SST-gel tubes). Specimens should be packaged as biohazardous material, and stored and transported on ice packs. A completed standard NHLS yellow fever case investigation form (available on the NICD website at www.nicd.ac.za) should accompany every specimen that is collected. Healthcare professionals requesting YFV tests should also contact the NICD to discuss the case before sending specimens (see contact details below). Specimens should be labelled clearly for attention 'Centre for Emerging and Zoonotic Diseases, NICD-NHLS, 1 Modderfontein Rd., Sandringham, Gauteng, 2192'.

8. How is yellow fever treated?

Treatment is mainly supportive, targeting symptoms such as dehydration and fever. There is no specific cure; however, supportive care has been shown to improve outcomes in seriously ill patients.

9. How can yellow fever be prevented?

Vaccination is the single most important preventative measure against yellow fever. In South Africa yellow fever vaccination and a valid proof of yellow fever vaccination certificate is required for travellers to and from regulated specific countries (http://www.who.int/ith/ITH_Annex_I.pdf). Travellers to these countries must obtain a yellow fever vaccination from an accredited travel health clinic at least 10 days prior to departure, and carry the original certificate with them. This includes passengers in transit, irrespective of whether they have left the airport or the time spent in that country. Yellow fever vaccine is contraindicated in pregnant women, infants <6 months, individuals with egg allergies, and certain immunosuppressed individuals (including HIV-infected persons with CD4 <200/mm³); however, these individuals still require an official vaccine waiver certificate. The WHO has regulated that a single, lifetime dose of yellow fever vaccine is sufficient, and regulated that all countries comply with this regulation by July 2016. However some countries require yellow fever vaccination boosters every 10 years.

Vaccinated travellers should still take precautionary measures to avoid being bitten by mosquitoes to avoid yellow fever virus and other mosquito-borne infections (e.g. malaria and dengue fever). In the daytime, this includes using insect repellents containing DEET, staying in well-screened and air-conditioned buildings, and wearing loose long-sleeved shirts and pants when outdoors. Insecticides, insecticide-treated bed nets and light-coloured clothing are useful preventive measures at night.

10. Where can I find out more information?

Contact the Centre for Emerging and Zoonotic Diseases (Dr Jacqueline Weyer: (Tel) +27 11 386 6376, jacquelinew@nicd.ac.za) or the NICD Division of Public Health, Surveillance, and Response +27 11 386 0542, or for medical / clinical related queries after hours, the NICD Hotline +27 82 883 9920 (for use by healthcare professionals only)