Yellow fever

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- **Yellow fever is an acute viral haemorrhagic disease transmitted by infected mosquitoes. The "yellow" in the name refers to the jaundice that affects some patients.**
- **Symptoms of yellow fever include fever, headache, jaundice, muscle pain, nausea, vomiting and fatigue.**
- **A small proportion of patients who contact the virus develop severe symptoms and approximately half of those die within 7 to 10 days.**
- **The virus is endemic in tropical areas of Africa and Central and South America.**
- **Large epidemics of yellow fever occur when infected people introduce the virus into heavily populated areas with high mosquito density and where most people have little or no immunity, due to lack of vaccination. In these conditions, infected mosquitoes of the Aedes aegypti species transmit the virus from person to person.**
- **Yellow fever is prevented by an extremely effective vaccine, which is safe and affordable. A single dose of yellow fever vaccine is sufficient to grant sustained immunity and life-long protection against yellow fever disease. A booster dose of the vaccine is not needed. The vaccine provides effective immunity within 10 days for 80-100% of people vaccinated, and within 30 days for more than 99% of people vaccinated.**
- **Good supportive treatment in hospitals improves survival rates. There is currently no specific anti-viral drug for yellow fever.**
- **The Eliminate Yellow fever Epidemics (EYE) Strategy launched in 2017 is an unprecedented initiative. With more than 50 partners involved, the EYE partnership supports 40 at-risk countries in Africa and the Americas to prevent, detect, and respond to yellow fever suspected cases and outbreaks. The partnership aims at protecting at-risk populations, preventing international spread, and containing outbreaks rapidly. By 2026, it is expected that more than 1 billion people will be protected against the disease.**

Signs and symptoms

- Once contacted, the yellow fever virus incubates in the body for 3 to 6 days. Many people do not experience symptoms, but when these do occur, the most common are fever, muscle pain with prominent backache, headache, loss of appetite, and nausea or vomiting. In most cases, symptoms disappear after 3 to 4 days.
- A small percentage of patients, however, enter a second, more toxic phase within 24 hours of recovering from initial symptoms. High fever returns and several body systems are affected, usually the liver and the kidneys. In this phase people are likely to develop jaundice (yellowing of the skin and eyes, hence the name ‘yellow fever’), dark urine and abdominal pain with vomiting. Bleeding can occur from the mouth, nose, eyes or stomach. Half of the patients who enter the toxic phase die within 7 - 10 days.

- **Diagnosis**
- Yellow fever is difficult to diagnose, especially during the early stages. A more severe case can be confused with severe malaria, leptospirosis, viral hepatitis (especially fulminant forms), other haemorrhagic fevers, infection with other flaviviruses (such as dengue haemorrhagic fever), and poisoning.
- Polymerase chain reaction (PCR) testing in blood and urine can sometimes detect the virus in early stages of the disease. In later stages, testing to identify antibodies is needed (ELISA and PRNT).

Transmission

- The yellow fever virus is an arbovirus of the flavivirus genus and is transmitted by mosquitoes, belonging to the Aedes and *Haemogogus* species. The different mosquito species live in different habitats - some breed around houses (domestic), others in the jungle (wild), and some in both habitats (semi-domestic). There are 3 types of transmission cycles:

- Sylvatic (or jungle) yellow fever: In tropical rainforests, monkeys, which are the primary reservoir of yellow fever, are bitten by wild mosquitoes of the *Aedes* and *Haemogogus* species, which pass the virus on to other monkeys. Occasionally humans working or travelling in the forest are bitten by infected mosquitoes and develop yellow fever.
- Intermediate yellow fever: In this type of transmission, semi-domestic mosquitoes (those that breed both in the wild and around households) infect both monkeys and people. Increased contact between people and infected mosquitoes leads to increased transmission and many separate villages in an area can develop outbreaks at the same time. This is the most common type of outbreak in Africa.
- Urban yellow fever: Large epidemics occur when infected people introduce the virus into heavily populated areas with high density of *Aedes aegypti* mosquitoes and where most people have little or no immunity, due to lack of vaccination or prior exposure to yellow fever. In these conditions, infected mosquitoes transmit the virus from person to person.

Treatment and Prevention

- Good and early supportive treatment in hospitals improves survival rates. There is currently no specific anti-viral drug for yellow fever but specific care to treat dehydration, liver and kidney failure, and fever improves outcomes. Associated bacterial infections can be treated with antibiotics.
- **1. Vaccination**
- Vaccination is the most important means of preventing yellow fever.
- The yellow fever vaccine is safe, affordable and a single dose provides life-long protection against yellow fever disease. A booster dose of yellow fever vaccine is not needed.
- Several vaccination strategies are used to prevent yellow fever disease and transmission: routine infant immunization; mass vaccination campaigns designed to increase coverage in countries at risk; and vaccination of travellers going to yellow fever endemic areas.
- In high-risk areas where vaccination coverage is low, prompt recognition and control of outbreaks using mass immunization is critical. It is important to vaccinate most (80% or more) of the population at risk to prevent transmission in a region with a yellow fever outbreak.
- There have been rare reports of serious side-effects from the yellow fever vaccine. The rates for these severe ‘adverse events following immunization’ (AEFI), when the vaccine provokes an attack on the liver, the kidneys or on the nervous system are between 0 and 0.21 cases per 10 000 doses in regions where yellow fever is endemic, and from 0.09 to 0.4 cases per 10 000 doses in populations not exposed to the virus *(1)*.
- The risk of AEFI is higher for people over 60 years of age and anyone with severe immunodeficiency due to symptomatic HIV/AIDS or other causes, or who have a thymus disorder. People over 60 years of age should be given the vaccine after a careful risk-benefit assessment.
- People who are usually excluded from vaccination include:
- infants aged less than 9 months;
- pregnant women – except during a yellow fever outbreak when the risk of infection is high;
- people with severe allergies to egg protein; and
- people with severe immunodeficiency due to symptomatic HIV/AIDS or other causes, or who have a thymus disorder.
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