WHO position paper: Vaccination against Yellow Fever

Summary

Yellow fever (YF) is a mosquito-borne viral disease of humans and other primates, currently endemic in 44 countries in the tropical regions of Africa and South America. According to WHO estimates from the early 1990s, 200 000 cases of YF, with 30 000 deaths, are expected globally each year, the majority occurring in sub-Saharan Africa.
Large scale YF vaccination has been very effective. However, where mass vaccination campaigns have ceased and coverage has not been sustained, the disease has recurred, resulting in major outbreaks.
All current commercially available YF vaccines are live attenuated viral vaccines from the 17D lineage. YF vaccines are given as a single dose (0.5 ml) and the manufacturers recommend that the vaccine be injected either subcutaneously or intramuscularly.
Healthy individuals rarely fail to develop neutralizing antibodies after vaccination. Clinical trials have found that 80%–100% of vaccine recipients develop protective levels of neutralizing antibodies within 10 days and 99% do so within 30 days. Protection appears to last at least 20–35 years and probably for life.
There are three types of serious adverse events following immunization with YF vaccine: Immediate severe hypersensitivity or anaphylactic reactions; YF vaccine-associated neurologic disease (YEL-AND); YF vaccine-associated viscerotropic disease (YEL-AVD). To date, all reported and published cases of YEL-AND and YEL-AVD have been described in primary vaccines. The reporting rate of YEL-AVD is highest among persons aged ≥70 years but also higher in people aged ≥60 years.

WHO position

Yellow Fever vaccination is performed to:

- protect populations living in areas subject to endemic and epidemic disease;
- protect travellers visiting these areas;
- prevent international spread by viraemic travellers.

A single dose of YF vaccine is sufficient to confer sustained life-long protective immunity against YF disease. A booster dose is not necessary.

Endemic countries

- endemic countries should introduce YF vaccine into their routine immunization programmes, giving it to children at age 9–12 months at the same time as the measles vaccine.
- Preventive mass vaccination campaigns are recommended where vaccination coverage is low.
- Vaccination should be provided to everyone aged ≥9 months in any area with reported cases.
- Countries with ***areas*** at-risk of YF disease should introduce YF vaccine into their immunization programmes.

Travellers

- YF vaccine should be offered to all unvaccinated travellers aged > 9 months, travelling to and from at-risk areas, unless they belong to groups for whom it is contraindicated.

HIV-infected individuals

- YF vaccine may be offered to asymptomatic HIV-infected persons with CD4 T-cell counts ≥200 cells/mm³.
- YF vaccine may be administered to all clinically well children: HIV testing is not required.

Pregnant women

A risk-benefit assessment should be undertaken for all pregnant and lactating women noting that:

- In YF endemic areas, or during outbreaks, the benefits of YF vaccination are likely to far outweigh the risk of potential transmission of vaccine virus to the fetus or infant.
- Pregnant women and nursing mothers should be counselled on the potential benefits and risks of vaccination, noting that the benefits of breastfeeding far outweigh alternatives.

- Vaccination is recommended, if indicated, for pregnant or breastfeeding women travelling to endemic areas when such travel cannot be avoided or postponed.

Contraindications

- YF vaccine is contraindicated in children aged <6 months. It is not recommended for those aged 6–8 months, ***except*** during epidemics.
- severe hypersensitivity to egg antigens.
- severe immunodeficiency such as: primary immunodeficiencies, thymus disorder, symptomatic HIV infection or CD4 T-cell values <200 per mm^3, malignant neoplasm treated with chemotherapy, recent haematopoietic stem cell transplantation, drugs with known immunosuppressive or immunomodulatory properties, and current or recent radiation therapies.

Precautions:

Individuals aged over 60 years: the overall risk of adverse effects is higher in primary vaccinees ≥60 years of age, but remains low. A risk benefit assessment should be performed, taking into consideration the following:

- the risk of acquiring YF disease (e.g. location, season, duration of exposure, occupational and recreational activities, and local rate of virus transmission in the potential area of exposure)
- the risk of a potential adverse event following immunization (e.g. age, underlying medical conditions, medications being taken).

Co-administration

- YF vaccine may be administered simultaneously with other vaccines.
- Oral polio vaccine may be given at any time in relation to YF vaccination.

Surveillance

- YF control strategies should include sound epidemiologic surveillance, supported by appropriate diagnostic facilities, for both YF disease and adverse events following immunization.
- Surveillance and clinical studies should be used to identify specific risk groups (such as infants or HIV-infected patients) that may benefit from a second or booster dose.

Research priorities

- Additional data is needed on YF vaccine safety and immunogenicity including persistence of immunity in HIV-positive adults and children.
- Well-designed and adequately-powered studies are needed to assess co-administration of YF vaccine with other live vaccines, including MMR, and to assess the safety and immunogenicity of YF vaccine in pregnant women and in people aged ≥60 years.