

## Yellow Fever Vaccination

### Indications

Yellow fever (YF) vaccination may be recommended for travel to all countries in the endemic zones whether or not an international certificate is required.

- **'Endemic' regions** include countries (or areas within countries) where there is the potential for human infection because of the presence of YF virus in mosquitoes and non-human primates. The potential to introduce YF into humans and to urban settings exists in endemic countries. Because of the possibility of acquiring disease in endemic countries, vaccination against YF may be recommended for travellers, particularly those who visit rural areas. In some cases vaccination may be mandatory.
- **'Infected' countries** are those that are reporting human cases of YF to the World Health Organisation (WHO). Countries infected with YF are listed in the Weekly Epidemiological Record. Vaccination is recommended and may be required for visitors to infected areas. Because of under reporting, infected areas may be more widespread than those that are formally designated as infected by the WHO.

### Availability

There are currently two yellow fever vaccines licensed for use in the United Kingdom. These use the 17D strain of yellow fever virus.

The Summary of Product Characteristics (SPC) for the individual vaccine should be consulted for specific information relating to the product.

Vaccine	Manufacturer/ Distributor	Schedule	Length of protection	Age range
Arilvax	Chiron	1 dose	10 years	Minimum age 9 months. Seek medical advice for infants 6-9 months who are travelling to high risk areas
Stamaril	Aventis Pasteur	1 dose		

The vaccine induces a rapid immune response with 90% of recipients achieving protective levels of antibody within 10 days. Immunity following vaccination has been shown to be long lasting and possibly life long. However, International Health Regulations require re-vaccination at 10-year intervals if indicated, in order to retain a valid certificate and prevent the importation of yellow fever virus into susceptible countries.

## Contraindications

(specific contraindications should be reviewed in the vaccine Summary of Product Characteristics)

- Children under 9 months of age
- Febrile illness
- Immunocompromised hosts
- Pregnancy (unless the risk of disease outweighs the theoretical risk of vaccination)
- Anaphylaxis to egg protein
- Allergy to any component of vaccine
- Thymus disorder, including myasthenia gravis, thymoma, thymectomy and DiGeorge syndrome <sup>1</sup>

## Adverse Events

The 17D strain virus yellow fever vaccine has been in use for more than 50 years and has an excellent safety profile. It has been estimated that 300-400 million doses of the vaccine have been administered worldwide<sup>2</sup>. Reactions to YF vaccine are usually mild and short lived. They include myalgia, headache, low-grade fever, and typically occur during the first 5-10 days post vaccination.

Serious adverse events are rare but have been reported and fall into three main categories: hypersensitivity reactions, vaccine-associated neurotropic disease (VAND) and vaccine-associated viscerotropic disease (VAVD).

### **Hypersensitivity reactions**

The vaccine is propagated in chick embryos. Vaccine stabilizers include beef gelatin and sorbitol. Anaphylaxis and urticaria as a result of sensitivity to either egg or other vaccine components, occurs at an incidence between 1:130,000 and 1:250,000<sup>3</sup>.

### **Vaccine-Associated Neurotropic Disease (VAND)**

VAND manifests as post-vaccine encephalitis with fever, headache, cognitive impairment and CSF pleocytosis. There have been at least 26 cases worldwide of encephalitis (temporally associated with or confirmed to be caused by 17D strain vaccine) reported in the scientific literature since 1945. Sixteen cases were infants under 9 months of age<sup>4</sup>. Infants below 6 months of age seem to be more susceptible to post-vaccine encephalitis and for this reason vaccine should not be given in this age group.

Reports since the mid 1990's have described several cases of VAND in adult recipients of YF vaccine<sup>5</sup>. The risk is about 6 cases per million doses of YF vaccine and is higher for vaccine recipients over the age of 60 years.

## Vaccine-Associated Viscerotropic Disease (VAVD)

VAVD manifests as fever, jaundice and multiple-organ system failure following YF vaccination. The syndrome has only been recently recognised after the first 7 cases were reported from 1996 to 2001<sup>6</sup>. To date there have been 7 confirmed cases and up to 11 suspected or probable cases of VAVD worldwide<sup>2</sup>. All cases have occurred following the first YF vaccination<sup>2</sup>.

It is not known if underlying host factors (genetic or acquired) or pre-existing clinical conditions contribute to the course or outcome of yellow fever VAVD.

Estimated reported incidence of VAVD in US citizens was found to be 1 per 200,000 to 300,000 doses distributed, however, it is possible that the syndrome has been under-reported<sup>2</sup>. The frequency is three-to four-fold higher in persons over the age of 60 years. There have been no reports of VAVD in the United Kingdom.

## References

1. Barwick R. History of thymoma and yellow fever vaccination . Lancet 2004; 264: 936
2. World Health Organisation, Yellow Fever Vaccine, [Weekly epidemiological record 2003, 78, 349-360](#)
3. Kelso JM, Mottrey GT, Tsai TF. Anaphylaxis from yellow fever vaccine, J Allergy Clin Immunol 1999; 103:698-701
4. Centres for Disease Control and Prevention, [Yellow Fever Vaccine, Recommendations of the Advisory Committee on Immunisation Practices \(ACIP\), 2002, MMWR November 8, 51, No. RR-17](#)
5. Centres for Disease Control and Prevention, [Adverse Events Associated with 17D-Derived Yellow Fever Vaccination – United States, 2001-2002, MMWR 2002, November 8; 51:989-993](#)
6. Centres for Disease Control and Prevention, [Fever, jaundice and multiple organ system failure associated with 17D derived yellow fever vaccination, 1996-2001, MMWR 2001, August 3; 50:643](#)