The materno-foetal transmission of arboviral diseases has been described for dengue fever, Japanese encephalitis, and infections with West Nile virus and chikungunya virus. The pathogenesis can only become more widespread given the global rise in arbovirus transmission by mosquitoes. Some arboviruses belonging to the genera *Flavivirus* and *Alphavirus* are able to cross the placental barrier in a small number of pregnant women. *Aedes aegypti* in the Caribbean and *Aedes albopictus* in continental France and Réunion are the vectors of dengue fever and chikungunya. Materno-foetal transmission of arboviruses can occur at any stage of pregnancy: they are rare but severe during the early stages of pregnancy, more frequent but milder towards the end of pregnancy. There is a high risk of transmission to the newborn during delivery if the mother is in a period of viraemia.

**Dengue fever**

All four dengue flaviviruses (DEN 1, DEN 2, DEN 3, and DEN 4) may disrupt the pregnancy and threaten the life of the unborn child.

In pregnant women, the clinical symptoms are those normally associated with dengue fever (sudden high fever during 2 to 7 days, with diffuse pain, morbilliform rash, and petechiae).

During the entire pregnancy, until a few days before delivery, maternal dengue fever maintains the usual characteristics of dengue fever, along with an exacerbation of the complications of pregnancy: thrombocytopenia, haemolysis, and elevated liver enzymes.

The obstetric consequences are essentially the following:

- A higher rate of spontaneous miscarriage during the 1st trimester, and a higher rate of in utero foetal death (13% vs. 1.8% in the general population)
- There are no reports of teratogenic effects
- A higher rate of premature birth (21% vs. 11.5% in the general population)
- A higher risk of acute uterine bleeding during delivery.

Congenital dengue fever is caused by the transplacental transmission of the virus in the days before delivery (direct transmission of the virus to the child). Congenital dengue fever is reported in endemic areas. In the newborn, the first signs appear between the 1st and 11th days, and last for 1 to 5 days. In children, the signs are highly variable, ranging from asymptomatic to the usual manifestations of dengue fever: from high fever, sometimes associated with thrombocytopenia, to severe cases of respiratory distress or haemodynamic failure potentially leading to the death of the newborn.

Maternal antibodies cross the placental barrier and protect the child during the first six months of life.

To date, individual protection against mosquitoes is the only effective means of prevention.

A vaccine will soon be commercially available.

**Chikungunya**

The alphavirus responsible for chikungunya is also transmitted by *Aedes* mosquito bites, occurring outside and during the day, especially at dusk and dawn.

This virus can be transmitted from mother to foetus during pregnancy. Materno-foetal transmission is very rare before the 22nd week of amenorrhoea, and can be detected by RT-PCR analysis of the amniotic fluid. During this period, the prognosis is poor and associated with a high risk of in utero foetal death. After the 22nd week of amenorrhoea, the risk for the foetus is low to non-existent.

Most materno-foetal transmission occurs during the peripartum period, from 2 days before to 2 days after delivery, with viraemic mothers. In these cases, the rate of materno-foetal transmission is 50%. In few instances, the mother remains asymptomatic and is thus diagnosed retrospectively. However, most cases show a febrile syndrome with diffuse pain, particularly joint pain, and skin eruptions.

The newborn is asymptomatic at birth then develops an eruption with erythroderma 3 to 7 days after the mother,
Followed by fever and pains, then digestive signs (refusal to breastfeed, diarrhoea), and finally widespread oedema followed by desquamation of the extremities. Neurological complications (convulsions, abnormalities on neurological examination and EEG), haemostatic disorders (DIC) and intracerebral bleeding may also occur.

The main preventive measures are vector control (fight against natural and artificial stagnant water) and individual protection against mosquitos.

**Japanese encephalitis**

This type of *Flavivirus* infection has a very broad geographic range in Asia, and severe neurological symptoms are reported for 1 in every 25–1000 infected subjects. It is the primary cause of encephalitis in Asia. Materno-foetal transmissions are rare.

There is a major risk of foetal death during the first half of pregnancy. Mothers infected during the second half of pregnancy have given birth to apparently healthy babies.

A vaccine is currently available in several Asian countries.

Véronique Jacomo, Biomnis Lyon, January 2015.

**West Nile virus**

This is an arbovirus of the genus *Flavivirus*, transmitted by the female *Culex* mosquito, whose reservoir is wild and migratory birds, and for which horses and humans are accidental hosts.

This disease is epidemic in Asia, Africa, the Middle East, and central Europe, and also in the USA and the Mediterranean regions of France since the 2000s.

Clinically, 80% of cases are asymptomatic, whereas the remaining patients develop sudden high fever with headaches, pains, swelling of the cervical lymph nodes, and meningoencephalitis-type neurological complications in 1% of cases.

Materno-foetal transmission is possible but is extremely rare. During the first trimester of pregnancy, this infection is associated with a higher risk of spontaneous abortions. Nonetheless, there are reported cases of mothers who developed meningoencephalitis from West Nile virus infection during early pregnancy, and gave birth to healthy babies. Congenital infection is possible but is very rare: it is associated with malformations, particularly of the brain. Materno-foetal transmission during the last month of pregnancy, with severe neurological complications in the newborn, has also been described.

The low risk of transmission is probably due to the low maternal viraemia.

Prevention also relies on vector control and individual protection against mosquitos.