

## **Diseases transmitted by *Aedes Aegypti***

### **Dengue**

#### **What is Dengue?**

Dengue is a viral disease transmitted by the *Aedes aegypti* mosquito. In Brazil, it was first identified in 1986. It is estimated that 50 million dengue infections occur annually in the world. In the State of Goiás, the reintroduction of the disease occurred in 1994 in the city of Goiânia. Thereafter the cases have increased and today Goiás is an endemic region for dengue fever and with large numbers of cases, having a significant increase since 2010.

The main form of transmission is by the bite of the *Aedes aegypti* mosquito. There are records of vertical transmission (mother-baby) and by blood transfusion. There are four different types of the dengue virus: DEN-1, DEN-2, DEN-3, and DEN-4.

#### **What are the symptoms?**

The dengue infection may be asymptomatic, mild, or cause serious illness, leading to death. Typically, the first manifestation of dengue is sudden, high fever (39° to 40°C), of, which usually lasts from 2 to 7 days, followed by headache, pain in the body and joints, fatigue, weakness, pain behind the eyes, skin rash, and itchy skin. Weight loss, nausea, and vomiting are common. It can be difficult to differentiate the disease during the initial febrile phase of the illness. The severe form of the disease include severe and continuous abdominal pain, persistent vomiting, bleeding under the skin and nosebleeds, among other symptoms.

### **Zika virus**

#### **What is Zika?**

Zika is a virus transmitted by the *Aedes aegypti* and identified for the first time in Brazil on April of 2015. The Zika virus was given the same name of the place of origin of its identification in 1947, after detection in Rhesus monkeys while monitoring for yellow fever in Zika Forest in Uganda.

### **What are the symptoms?**

About 80% of the people infected by the Zika virus do not show any clinical sign of disease. The main symptoms are headache, low-grade fever, mild pain in the joints, red spots on the skin, itching, and redness in the eyes. Other less frequent symptoms are body swelling, sore throat, cough, and vomiting. In general, the evolution of the disease is mild, and the symptoms disappear spontaneously after 3 to 7 days. However, joint pain may persist for approximately one month. Severe and atypical forms are rare, but when they occur, it can exceptionally lead to death, as identified in November of 2015, for the first time in history.

## **Chikungunya**

### **What is Chikungunya?**

The Chikungunya Fever is a disease transmitted by the *Aedes aegypti* and *Aedes albopictus* mosquitoes. In Brazil, the circulation of the virus was first identified in 2014. Chikungunya means “that which bends up” in Makonde, one of the languages in Tanzania. It is a reference to the curved appearance of patients who were treated at the first documented epidemic in Tanzania, located in East Africa between 1952 and 1953.

### **What are the symptoms?**

The main symptoms are sudden high fever, intense pain in the joints of feet and hands, as well as fingers, ankles, and wrists. It may also occur headaches, muscles pain, and red spots on the skin. It is not possible to be infected with the chikungunya virus more than once. Once infected, a person is immune for life. The symptoms begin between 2 to 12 days after the mosquito bite. The mosquito acquires the virus CHIKV by stinging a person infected during the period in which the virus is present in the infected organism. About 30% of cases show no symptoms.

**When presenting symptoms and signs as described above, for the three diseases, it is important to seek for health service.**

## **How to prevent Dengue, Chikungunya, and Zika?**

There are still no vaccine or drugs against the three diseases, therefore, the only form of prevention is to eliminate the *Aedes aegypti* mosquito, keeping the home always clean, eliminating potential breeding grounds. Clothes that minimize the exposure of the skin during the day, when mosquitoes are most active, provides some protection to mosquito bites and can be adopted especially during outbreaks. Insect repellents and insecticides can also be used according to the label instructions. Individuals who travel to cities with the transmission of dengue, chikungunya, and zika should avoid mosquito bites, especially during the day. It is recommended to use long and light colored clothes, and the use of insect repellents on exposed areas, according to the manufacturer's directions.

### **Recommendations of the Ministry of Health to travelers**

Dengue, chikungunya, zika, and yellow fever are diseases transmitted by the *Aedes aegypti* mosquito and, regardless of the destination or purpose of the trip, it is important that the traveler adopt measures to strengthen the protection against the mosquito. Check out the Ministry of Health recommendations for travelers to protect themselves against the mosquito bites:

- Upon arrival at your place of accommodation (hotel, hostel, and others), check carefully if there is any mosquito breeding and eliminate it. The risk of infection by dengue, yellow fever, chikungunya, and zika virus can be reduced if the mosquito bites are avoided;
- Stay in places that have protective screens on doors and windows, especially if you are away from the state capitals, or bring a mosquito net/curtain as an alternative;
- During ecotourism tours, wear clothes that protect the body against mosquito bites and ticks, such as long-sleeve shirts, pants, socks, and closed shoes;
- Apply insect repellent on exposed areas of the skin, following the manufacturer's instructions.

**In the case of pregnant women**, the Ministry of Health recommends that a qualified prenatal should be made and also all examinations provided at this stage, in addition to reporting to the health professionals of any changes that occur during pregnancy. It

is important to emphasize that, in any situation, pregnant women need to consult their doctor before traveling and special care is required when traveling. Pregnant women and women of childbearing age with the possibility of becoming pregnant should protect themselves from mosquito bites by adopting the following measures:

- Avoid environments with presence of mosquitoes and with no protection measures recommended;
- Whenever possible, wear clothes that cover most of the skin surface;
- Insect repellents containing DEET, icaridin or picaridin and IR 3535 or EBAAP are considered safe to use during pregnancy;
- Before leaving the house to travel, check carefully if there is any mosquito breeding and eliminate it.

**People infected with the zika, chikungunya, or dengue virus are the reservoir of infection to other people, both at home and in the community. Therefore, the sick person should follow the protective measures to avoid the spread of the disease.**

### Yellow fever

#### **What is yellow fever?**

It is an acute febrile disease, of systemic effects and is transmitted to humans by the infected female mosquito bite. In the Urban Yellow Fever (FAU – Febre Amarela Urbana), the vector is the *Aedes aegypti* and the human being is the main host.

#### **What are the symptoms?**

The typical clinical picture is characterized by manifestation of hepatic (liver) and renal (kidneys) failure, in many cases leads to death in about a week. There is no specific treatment. Is only symptomatic, with careful assistance to patient that must be under hospitalization and remain at rest, with replacement of liquids and blood losses, when indicated. In severe forms, the patient should be treated in an intensive care unit (ICU).

### **VACCINATION**

#### **How to prevent?**

It is recommended yellow fever vaccine (attenuated) to all the population from 9 months of age travelling from Areas Without Vaccine Recommendation to Areas With Vaccine Recommendation. The administration of the vaccine must be held at least 10 days before the trip to be considered immunized (first dose). Protective antibodies appear between the 7<sup>th</sup> and 10<sup>th</sup> day after the application, which is why immunization should occur 10 days before joining Areas With Vaccine Recommendation. The new guidelines for the yellow fever vaccine is as follows:

- **Children from 9 months to 4 years 11 months and 29 days of age:** receive 1 dose at 9 months and 1 booster dose at 4 years of age
- **Individuals from 5 years of age, who have received one dose of the vaccine before completing 5 years of age:** receive a single booster dose. Interval must be at least of 30 days.
- **Individuals from 5 years of age who have never been vaccinated or without proof of vaccination:** receive the first dose of the vaccine and 1 booster dose, 10 years after this dose.
- **Individuals from 5 years of age who received 2 doses of vaccine:** consider vaccinated. Do not receive any other dose.
- **Individuals with 60 years of age and older who have never been vaccinated or without proof of vaccination:** a doctor should evaluate the benefit/risk of vaccination, taking into account the risk of the disease.

Therefore, adults who have 2 doses proven in the vaccination card, can be considered vaccinated, and no longer needs to receive another dose. If the individual has taken only one dose over 10 years, he/she should receive another dose.

### **About the use of insect repellents (bug spray)**

The repellents applied to the skin, can be part of the precautions against dengue, chikungunya, and zika. The recommendation from Anvisa (Agencia Nacional de Vigilância Sanitária – Brazilian Health Surveillance Agency) is clear: there is no impediment of the use of these products to pregnant women, since the insect repellents are properly registered with the Agency. The recommendations of use described on the label of each product should be strictly followed. Products that contains DEET should not be used in children under two years old. Between 2 years and 12 years of age, the maximum concentration of the product must be of 10% and the application must be restricted to three times a day. **Some precautions must be observed when using:**

- Insect repellents should be applied on exposed areas of the body and over the clothes;
- The reapplication must be made in accordance with the indication of each manufacturer;
- When using insect repellents in the form of spray on the face or in children, it is ideal to first apply on the hand and then spread on the body, always remembering to wash your hands with soap and water after the application;
- In case of contact with eyes, it is important to immediately wash the area with running water

In addition to DEET, the other recurring active ingredients in insect repellents in Brazil are used in cosmetics: the Icaridin and IR 3535, in addition to essential oils, such as Citronella. Although safety studies conducted in pregnant women have not been found, these ingredients are recognized as safe for use in cosmetic products according to the industry regulations.

### **Eco-friendly insect repellents and insecticides:**

Insecticides used to kill adult mosquitoes, and eco-friendly insect repellents used to ward off mosquitoes (found in the form of coil, liquids, and pads for plug-ins), can also be adopted to combat the *Aedes aegypti* mosquito, as long as was registered at Anvisa

(Agencia Nacional de Vigilância Sanitária – Brazilian Health Surveillance Agency) and that all care and precautions are followed as described on the labels of the products. The “natural” insecticides that contain citronella, andiroba, and clove oil, among others, do not have proof of effectiveness or approval by Anvisa (Agencia Nacional de Vigilância Sanitária – Brazilian Health Surveillance Agency) at this point. Therefore, all products advertised as “natural”, commonly marketed as candles, environment odorants, cleaners, and incense, which indicate insect repellent properties, are not approved by the Agency and have no proven effectiveness.

**Measures to reduce the risk of disease or importance in public health during a trip**

Below are some practical tips and useful information that can help you protect your health:

- Find out about the location where you will be travelling. Verify if there is a risk of disease and the need for vaccines and other preventive measures;
- Always wash your hands with water and soap;
- Remember to use sunscreen, as well as hats and clothes suitable for the climate;
- Always use condoms to prevent sexually transmitted diseases, including AIDS and hepatitis. Do not share needles;
- Patients who use medication must bring the respective medication in their original boxes and the prescriptions;
- Avoid swimming in ponds and small streams of water, in order to avoid diseases as schistosomiasis (endemic in some states), as well as accidents with aquatic animals;
- Do not swim or fish alone. Drowning is one of the causes of death among tourists;
- Do not drive after drinking alcohol (prohibited for those under 18 years of age);
- When driving, always wear your seat belt. Keep children on the back seat with the seat belt/child safety seat for children under seven and a half years of age;

***Official information received by Goiás State Department of Public Health***

- To prevent diseases transmitted by mosquitoes (dengue, malaria, leishmaniosis, and others), one of the main recommendations is to correctly use insect repellents. Look for those containing DEET in concentrations equal or greater than 35%, or containing Icaridina in concentrations equal or greater than 20%;
- Try to wear light colored clothes and cover most of the skin. Use sunscreen before; the insect repellent should be the last layer;
- Avoid raw or undercooked foods;
- Use bottled or treated water and check if the seal is intact;
- Avoid consumption of food sold by street vendors;
- Avoid contact with animals, alive or dead, to eliminate the risk of disease such as rabies and others. In the event of an accident with animals, look for health service immediately;
- In case of fever, skin lesions, diarrhea, and others, look for health service;
- Keep your vaccination card updated.