



***Don't give mosquitoes a chance!***  
**Avoid getting chikungunya, dengue and zika**

*Prevention is your best medicine*



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Mosquitoes are not just pesky and annoying; they can also be dangerous. The *Aedes aegypti* mosquito, also called the Yellow Fever or dengue mosquito, spreads dengue, chikungunya and zika viruses, creating significant health risks for both young and old.

These viruses are spreading worldwide and are already present in the Caribbean. Unfortunately, there is no vaccination against or cure for chikungunya, dengue or zika yet. Preventing yourself from being bitten by mosquitoes, is your best alternative.

That's why this brochure, with many tips to prevent mosquito bites and to remove mosquito breeding sites, was developed. It has been written in close cooperation with the Curaçao Ministry of Health, Environment and Nature and we hope it will be of great use to you.

Enjoy reading about prevention!

The ENNIA Team



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This information brochure was developed in close cooperation with the Curaçao Ministry of Health, Environment and Nature. It was subsequently reviewed by all the relevant governmental institutions in Aruba, Bonaire and St. Maarten.

### 1.1 WHAT ARE MOSQUITO-RELATED DISEASES?

Chikungunya, dengue and zika are all infectious diseases with flu-like symptoms. These diseases are caused by the chikungunya virus, the dengue virus and the zika virus, which in turn are transmitted by a mosquito bite from the *Aedes aegypti* mosquito, when this mosquito is infected with one or more of the aforementioned viruses.

### 1.2 HOW OFTEN CAN YOU GET THESE DISEASES?

**Chikungunya** is caused by the chikungunya virus and you can only get chikungunya once.

**Dengue** is caused by 4 different viruses from the same virus family. That's why you can get dengue 4 different times.

**Zika** is caused by the zika virus and you can only get zika once.

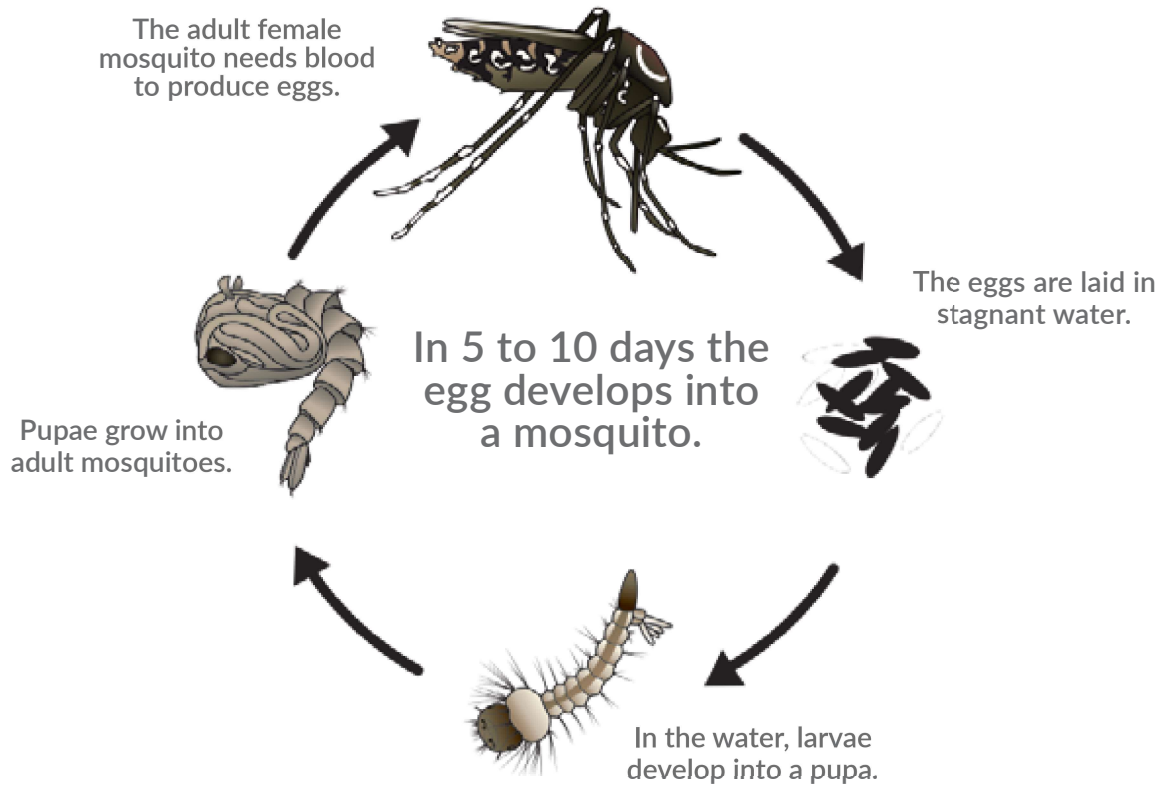
### 1.3 HOW ARE THESE DISEASES SPREAD?

The chikungunya, dengue and zika viruses are spread by the *Aedes aegypti* mosquito, which has been present in the Caribbean for a long time already. If this type of mosquito bites someone, it can spread all these diseases when its saliva, together with the virus, stays in the person it bit.



Scientists have established that zika can also be transmitted by having sex with someone who has already been infected with the zika virus. As of yet, there is no vaccine against chikungunya, dengue or zika, although scientists are working hard to develop one. To avoid contracting these viruses, make sure that you are not bitten by the *Aedes aegypti* mosquito.

## THE LIFE CYCLE OF THE AEDUS AEGYPTI MUG



### NO TIGER MOSQUITOES IN THE DUTCH CARIBBEAN

Many people think that chikungunya, dengue and zika are transmitted by the tiger mosquito. This is incorrect! The mosquito that transmits these infectious diseases to our six Caribbean islands is the *Aedes aegypti* mosquito. This mosquito is also called the dengue Mosquito or Yellow Fever Mosquito. For the time being, the *Aedes albopictus* (tiger mosquito) is not present in the Dutch Caribbean.



## 1.4 WHAT ARE THE CHARACTERISTICS OF THE *Aedes aegypti* MOSQUO

### General characteristics of the *Aedes aegypti* mosquito:

- It likes to be around humans.
- It has black and white stripes on its body and feet.
- It spreads various diseases, including dengue, chikungunya and zika.
- It lives about six weeks.
- It doesn't only stay in the vicinity of where it was born.
- It can also end up somewhere else by being blown there by the wind or is brought there in a car.



### Specific characteristics of the female *Aedes aegypti* mosquito:

- She needs blood to produce eggs.
- She prefers to bite humans.
- She also bites pets.
- She bites several times to collect enough blood.
- She bites throughout the day.
- She is most active at dawn and dusk.
- She breeds in stagnant water.
- She likes to lay her eggs in objects that can hold water, such as tires, scrap cars, and discarded plastic cups, cans, foam containers and bottles.
- She lays eggs 4 to 5 times during her lifetime; approximately 200 eggs in total.
- Her eggs can survive on the edges of objects for up to a year.
- Her eggs hatch when they come in contact with water, for example, when it rains.

## 1.5 WHAT SYMPTOMS DO CHIKUNGUNYA, DENGUE AND ZIKA CAUSE?

The infectious diseases chikungunya, dengue and zika cause flu-like symptoms that are in some ways similar and yet different from each other. In the table below we have listed these symptoms for you.

SYMPTOMS	CHIKUNKUNYA	DENGUE	ZIKA
Fever	●	●	●
Headache	●	●	●
Joint pain	●	●	●
Skin rash	●	●	●
Malaise/weakness in general	●	●	●
Nausea and vomiting	●	●	●
Pain behind the eyes		●	●
Irritated (red) eyes	●		●
Pain in the bones		●	
Nosebleeds, bleeding gums, blood in your stool, vomiting and bruising under the skin		●	
Arthritis (painful swollen joints, that feel warm to the touch)	●		
Painful, swollen wrists, ankles and soles of your feet	●		
Swollen legs, including thighs, knees, feet			●



## 1.6 HOW LONG DO THESE SYMPTOMS LAST?



JOINT PAIN



HIGH FEVER



NAUSEA AND VOMITING

### THE CHIKUNGUNYA VIRUS

Symptoms of the chikungunya virus start to appear 4 to 7 days after the virus has entered your body. The symptoms can persist for 3 to 10 days.

The most notable symptoms of chikungunya are sudden high fever, very painful joints, nausea and vomiting. Although rare, chikungunya can cause complications with your eyes, heart, blood circulation, nervous system, skin and kidneys.

### RISK GROUPS

People 65 years and older and people with a weak immune system due to illness, taking medication or undergoing medical treatment, are particularly susceptible. This also applies to people with a chronic condition such as high blood pressure, diabetes, heart disease, asthma or sickle cell disease. These people are at a higher risk of contracting chikungunya.

COLD FEVER

## THE DENGUE-VIRUS

Symptoms of the dengue virus also start to appear 4 to 7 days after the virus has entered your body.

The symptoms can last for 3 to 10 days. The most notable symptoms of dengue are high fever, chills, severe headaches and pain in your joints, muscles and bones. People with dengue can feel quite ill. Fortunately, most people recover fully without any complications.

In 5% of dengue cases, a form of dengue can develop that puts the patient's life at risk and hospitalization is necessary.

## RISK GROUPS

dengue can cause complications in children, pregnant women and the elderly. People with pre-existing conditions such as diabetes, asthma, sickle cell disease and people with a weak immune system are also more likely to have complications.

BAD HEADACHE



## THE ZIKA-VIRUS

Symptoms of the zika virus start to appear 3 to 12 days after the virus has entered your body. These symptoms can last for 2 to 7 days. The most notable symptoms of zika are a rash, red eyes (without pus), headaches, fever and joint pains. Fortunately, 80% of people who contract zika, don't even notice it, because the symptoms are so mild.

## ZIKA AND PREGNANCY

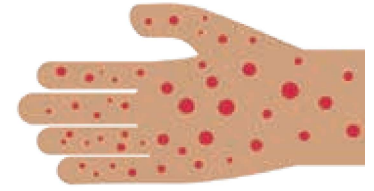
Research suggests that there is a connection between pregnant women infected with zika and miscarriages, premature deaths of babies after birth and microcephaly in the unborn child.

More research is needed to establish this connection with certainty.

However, it is certain that the zika virus can penetrate both the mother's placenta and the unborn child's nervous system.

## ZIKA AND PARALYSIS RASH

There are also indications that zika can cause Guillain-



SKIN RASH

Barré Syndrome (GBS), a syndrome that can cause paralysis symptoms.

This paralysis can occur after a zika infection and is usually temporary.

Some patients recover completely and some patients recover partially from this paralysis.

Very occasionally, GBS can be fatal. GBS occurs in the Caribbean as well. Scientists think that with the arrival of zika in our Caribbean region, we can expect more cases of GBS than usual.



AN UNBORN CHILD WITH MICROCEPHALY

## 1.7 WHERE CAN YOU GET INFORMATION ABOUT CHIKUNGUNYA, DENGUE AND ZIKA?

You have a right to receive good information!

### UP-TO-DATE AND RELIABLE INFORMATION ON MOSQUITO RELATED INFECTIOUS DISEASES

As a resident of the Dutch Caribbean, you can contact various government services. These agencies provide up-to-date and reliable information about chikungunya, dengue and zika. They can also send inspectors to your home when you are really being bothered by mosquitoes and/or if you suspect that there are mosquito breeding places nearby, which you cannot find by yourself.

### INFORMATION ABOUT HEALTH RISKS

In addition, your doctor or gynecologist is an important source of information regarding health risks from chikungunya, dengue and zika. If you are pregnant or want to become pregnant, we advise you to contact your doctor and/or gynecologist immediately in order to minimize the risks to your unborn child.

**Take a look at the back cover of this booklet for a convenient overview of helplines and information points in Aruba, Bonaire, Curaçao and St. Maarten.**



## 2.1 Tips to prevent mosquito bites

Don't get bitten!

### WEAR PROPER CLOTHES

- Wear clothes that cover your body as much as possible at sunrise and sunset, because that's when *Aedes aegypti* mosquitoes are most active.
- Wear long-sleeved shirts and long pants that mosquitoes cannot easily bite you through.
- Wear light-colored clothes, because dark clothes attract more mosquitoes.

### USE SCREENS AND MOSQUITO NETS

- Sleep under a mosquito net to avoid being bitten by mosquitoes.
- Always use mosquito nets for babies younger than 2 months, who are still too young to have mosquito repellents applied to them.
- Place screens on windows and doors to stop mosquitoes from entering and close doors and windows without screens very well.

### CHOOSE EFFECTIVE MOSQUITO REPELLENTS

- Use mosquito repellents to protect your family from mosquito bites.
- Choose a repellent that contains DEET, Picaridin, Lemon Eucalyptus Oil or IR3535.
- Use a repellent containing 20-25% DEET which will protect you for at least 6 to 8 hours.
- Reapply the repellent when it is no longer effective.



## 2.2 Tips to eliminate mosquito breeding places

Don't give mosquito eggs a chance to hatch!

Chikungunya, dengue and zika are transmitted by the *Aedes aegypti* mosquito. It is important to reduce the number of mosquitoes by ensuring that as few eggs as possible hatch. The female mosquito preferably lays her eggs in clean, stagnant water, but if there's no clean water, dirty water will suffice. Therefore, it is very important that puddles and all objects that can collect water in and around your home or property are eliminated, emptied or covered.

### ELIMINATE MOSQUITO BREEDING PLACES WEEKLY

- Remove all objects in and around your home that can collect water.
- Store them, cover them or throw them away in a covered garbage bin.
- Use a scouring sponge to remove all mosquito eggs from the edges of objects which you cannot cover or store. You can recognize the mosquito eggs as black dots.
- Change the water in flowerpots or vases regularly.
- Place cuttings and water plants, when possible, in earth or (beach) sand and make sure the water does not rise above the level of the earth/sand when you water them.

***“Aedes aegypti mosquitoes like to lay their eggs in open bottles, cups, foam trays, paint cans, ponds, pools, toys lying around, tires, refrigerators, scrap cars and boats in your yard.”***

Even if objects in your home or yard don't contain any water, mosquito eggs can remain attached to their edges. They will remain intact and can hatch later when they come into contact with water again. This can happen even up to a year after the eggs were laid.

## 2.3 Tips for your home

Make sure there's no standing water anywhere!

### 1. VASES, POTS AND SAUCERS UNDER POTTED PLANTS

- Clean vases at least once a week to remove any mosquito eggs.
- Ensure that water does not remain in saucers under potted plants too long.
- Ensure that large decorative pots in your yard are filled with soil or have holes in the bottom so that water can always drain away.

### 2. OLD CARS AND TIRES IN YOUR YARD

- Remove scrap cars from your yard so that they do not collect rainwater.
- Store tires under a roof so that they do not catch any rainwater.
- Cover tires well so that they cannot collect water under any circumstances

### 3. BOTTLES, CANS AND OTHER LITTER IN AND AROUND YOUR HOME

- Never leave bottles open.
- Throw away empty bottles in the garbage can or recycle them.
- Clean up litter, such as plastic bags, plastic cups, aluminum cans, beer bottles and foam containers, around your home and in your neighborhood, so that water cannot collect in them.





A large blue rain barrel and a brown water bowl are shown in a garden setting. The blue barrel is partially filled with water and is positioned next to a brown water bowl. The background features green foliage and purple flowers. The image is used as a background for the text on the right side of the page.

#### 4. ROOF GUTTERS AND RAIN BARRELS

- Clean roof gutters regularly and ensure that rainwater can always flow away.
- Clean rain barrels and water tanks regularly.
- Cover rain barrels with cloth or gauze, because mosquitoes can enter via small openings and lay their eggs in there.

#### 5. FOOD AND WATER BOWLS FOR PETS

- Clean pets' water bowls thoroughly at least once a week with a scouring sponge to remove any mosquito eggs.
- Change the water in your pets' water bowls daily.
- Get rid of any unused food and water bowls in and around your home.

#### 6. HOLLOW FENCE POSTS AND (ORNAMENTAL) CONCRETE BLOCKS IN YOUR YARD

- Fill hollow fence posts with (beach) sand.
- Ensure that hollow parts of ornamental and concrete blocks are always filled with earth or cement.
- Fill broken bottles, which have been placed on top of walls, with sand or cement.



**Continued: Tips for your home****7. OLD APPLIANCES AND BUILDING MATERIALS IN YOUR YARD**

- Remove old and unused washing machines and refrigerators from your yard.
- Use the free bulky waste collection service to get rid of these appliances.
- Ensure that the appliances you still use regularly, do not collect water.
- Ensure building materials and paint cans are covered well.

**8. PUDDLES AND PONDS IN YOUR YARD**


- Eliminate small puddles around your house so that no water remains.
- Fill larger puddles, that remain filled with water for several days, with sand.
- Add small fish, such as guppies and gold fish, into your pond because they like to eat mosquito eggs and larvae.

**9. SWIMMING POOLS IN USE AND NOT IN USE IN YOUR YARD AND NEIGHBORHOOD**

- Make sure there is always enough chlorine in your pool.
- Drain unused pools and cover them well so that no (rain)water can collect in them.
- Ask for advice from your mosquito information point when there are unattended pools filled with stagnant water in your neighborhood, while the residents/owners are abroad for an extended period of time.

**10. SANDBOXES, INFLATABLE CHILDREN'S POOLS AND TOYS IN YOUR YARD**

- Cover sandboxes well after use.
- Cover inflatable children's pools well and empty unused pools.
- Don't leave toys in the yard as they may collect water.



## 2.4 Tips for pregnant women

Protect your unborn child!

### PREVENT MOSQUITO BITES DURING YOUR ENTIRE PREGNANCY

The zika virus creates risks for your unborn child. Protect yourself as much as possible and make absolutely sure that you will not be bitten by mosquitoes.

### PRACTICE SAFE SEX DURING YOUR ENTIRE PREGNANCY

The zika virus is also sexually transmitted. Practice safe sex during your entire pregnancy and always use condoms. 80% of people who become infected with zika don't notice anything. Men can spread the zika virus without knowing it during sex with their (pregnant) partners.

### CONTACT YOUR FAMILY PHYSICIAN IMMEDIATELY IF YOU SUSPECT YOU HAVE ZIKA

If during your pregnancy you develop a rash, red eyes or sore joints, with or without fever, you should contact your family physician as soon as possible. Indicate what potential zika symptoms you have and mention that you are pregnant.

**Continued: zika prevention tips in and around your home****11. SEPTIC TANKS**

- Make sure your septic tank is sealed very well so that mosquitoes cannot fly inside through a narrow opening.
- Be aware that the eggs of the *Aedes aegypti* mosquito can also hatch in a septic tank because parts of the tank contain fresh water.
- Be aware that other dangerous mosquitos, such as the Culex mosquito, even lay their eggs in the dirty water in a septic tank.
- Cover the ventilation pipe of your septic tank well, with a mosquito net, for example.

**12. ABOVE GROUND CONCRETE WATER TANKS**

- Fill your cistern with guppies and gold fish instead of using larvicide.
- Make sure it always contains a sufficient number of guppies.
- Check with your government's mosquito information point if you still want to use larvicide.

**13. OLD AND NEW BOATS IN YOUR YARD**

- Turn boats that you do not use regularly, over in the yard.
- Cover your boat, kayak or jet skis well so that they cannot collect rainwater.
- Remove old boats that you no longer use, from your yard

**14. TOILETS THAT ARE RARELY USED**

- Flush toilets that you do not use regularly, at least once a week.
- Make sure the toilet tank or the reservoir is always closed well.
- Add a small amount of chlorine or toilet cleaner to the toilet water weekly.

## 2.5 Tips for travelling

### Protect yourself and your family while travelling

If you are travelling abroad with or without your family, many mosquito related infectious diseases, such as chikungunya, dengue, zika and Malaria, could be present at your travel destination. Always check this out with your family doctor. Ask what the best preventive medicine and other preventive measures you can take during your trip to prevent catching these diseases.

#### KEEP MOSQUITOES OUT OF YOUR HOTEL ROOM OR APARTMENT

- Choose a hotel or other place to stay that has air conditioning.
- Choose a hotel or other place to stay that has screens on the windows and doors.
- Buy a mosquito net, before you travel, that is already impregnated with mosquito repellent, online or at an outdoors store.
- Do not wash this mosquito net or expose it to sunlight, as this will break down the mosquito repellent.

#### COVER OUTDOORS YOURSELF AND YOUR YOUNG CHILDREN

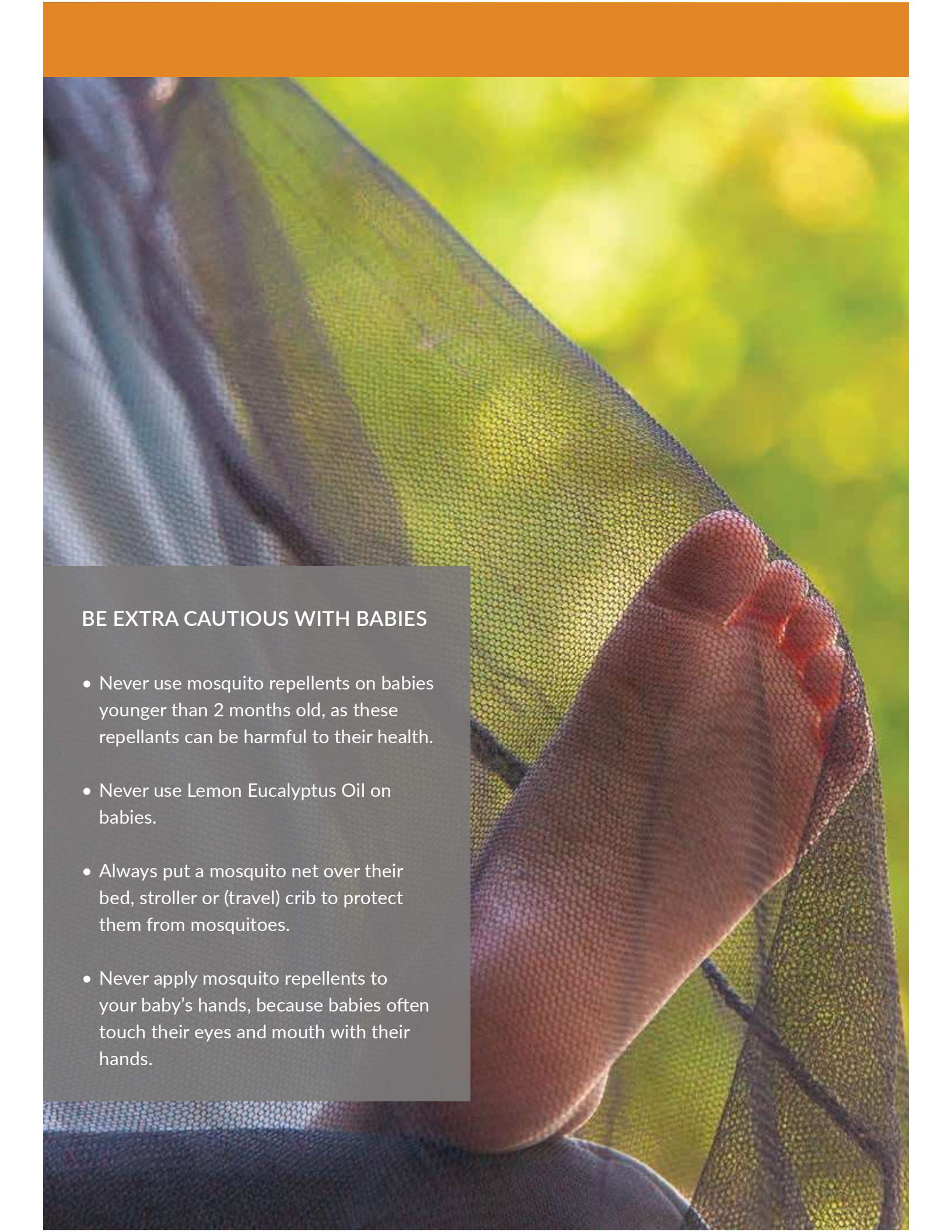
- Wear light-colored outdoor clothes, long sleeves and long pants and make sure your clothes are thick enough that mosquitoes cannot bite through them.
- Use only a little perfume, deodorant or fragrant soap, as these attract mosquitoes.
- Bring your own mosquito repellent if you are not sure the repellents available abroad are safe.
- Always apply sunscreen on your skin first and only then apply the mosquito repellent.





## PROTECT YOUR CHILDREN WELL

- Read the instructions carefully before applying mosquito repellent to children and always check whether you are even allowed to use this product on children.
- Always dress children in long sleeves and long pants that mosquitoes can't bite through.
- Never apply mosquito repellent to your child's hands and mouth.
- Never apply mosquito repellent to your child's irritated or damaged skin.
- Always apply the mosquito repellent on your own hands first and only then apply it to your children.
- Never use Lemon Eucalyptus Oil on children younger than 3 years old.



## BE EXTRA CAUTIOUS WITH BABIES

- Never use mosquito repellents on babies younger than 2 months old, as these repellents can be harmful to their health.
- Never use Lemon Eucalyptus Oil on babies.
- Always put a mosquito net over their bed, stroller or (travel) crib to protect them from mosquitoes.
- Never apply mosquito repellents to your baby's hands, because babies often touch their eyes and mouth with their hands.

## 2.5 Tips for responsible insecticide use

### Protect the environment!

In order to prevent chikungunya, dengue and zika, insecticides and larvicides are used to combat adult mosquitoes and their larvae and eggs. Improper use of insecticides can make mosquitoes resistant.

In addition, using excessive amounts of insecticide is harmful to the environment. This also kills other insects such as bees, butterflies and dragonflies, which are especially important for our ecological systems.

### RESPONSIBLE USE OF LARVICIDE

- Choose a sustainable and environmentally friendly solution to remove mosquito breeding places in areas where water collects or is stored.
- Cover these water containers carefully with gauze or cloth or use guppies.
- Add larvicide to the water to kill mosquito larvae, if the above methods don't work.

### CONTROL MOSQUITOS RESPONSIBLY WITHOUT USING INSECTICIDES

- Use an electric mosquito racket to kill mosquitoes by giving them a mild electric shock.
- Use an electric mosquito racket and search for mosquitoes in their hiding places.
- Check carefully under furniture, in dark corners, on the ceiling and on top of cabinets for mosquitoes.





## RESPONSIBLE USE OF INSECTICIDE SPRAYS

- Make sure that no people or animals are nearby when you yourself spray insecticides.
- Close windows and doors completely before you start.
- Don't forget to spray in out-of-the-way places.
- Look carefully under beds and in closets.
- Keep the sprayed area closed for at least 30 minutes.
- Air out the area thoroughly before using it again.

## RESPONSIBLE PRECAUTIONS WHEN THE GOVERNMENT SPRAYS YOUR NEIGHBORHOOD FROM A TRUCK

- Take proper precautions when trucks come to spray against mosquitoes in your neighborhood.
- Cover food, utensils, plates and cups well.
- Keep windows and doors open so that the insecticide can spread into all rooms.
- Close them only one hour after the spraying truck has left.

## PROTECT YOUR PETS FROM INSECTICIDE RESPONSIBLY

- Protect your pets such as fish and turtles. They are particularly sensitive to insecticides when these insecticides come in contact with water.
- Cover their food and water bowls well during the spraying.
- Wash these food and water bowls thoroughly once the spraying truck has left.



## 2.6 Tips if you already have the chikungunya, dengue or zika virus

Make sure you don't infect others!

### MAKE SURE YOU DON'T SPREAD THE CHIKUNGUNYA, DENGUE AND ZIKA VIRUS ANY FURTHER

Once you are infected with chikungunya, dengue or zika, you still have to ensure that you do not get bitten by a mosquito. When an *Aedes aegypti* mosquito bites you, it takes the virus, together with your blood, and can pass it on to another person. That's how the chikungunya, dengue and zika viruses spread unintentionally to your family members and other people in your neighborhood.

This information brochure was developed in close cooperation with the Curaçao Ministry of Health, Environment and Nature and was subsequently reviewed by all the relevant governmental institutions in Aruba, Bonaire and St. Maarten.

**ZIKA - ARUBA INFORMATION POINT**

**Department of Public Health /  
Directie Volksgezondheid**

Caya Ing. Roland H. Lacle 4, Oranjestad, Aruba  
T: (+297) 522 4200 / 597 5000

**GKMB (Gele Koorts en Muskieten Bestrijding  
- Combating Yellow Fever and Mosquitoes)**

Barcadera 1-D, Santa Cruz, Aruba  
T: (+297) 585 3325

**ZIKA - BONAIRE INFORMATION POINT**

**Department of Public Health**

Directie Samenleving & Zorg,  
Openbaar Lichaam Bonaire,  
Kaya Neerlandia 41, Bonaire  
T: (+599) 717 2211

**ZIKA - CURAÇAO INFORMATION POINT**

**Ministerie van Gezondheid, Milieu  
en Natuur (GMN)**

Sector Gezondheid, Epidemiologie en Onderzoek  
en Technisch Hygienische Zorg  
Piscaderaweg 49, Curaçao  
T: (+5999) 432 2850 / 432 2851  
M: 9345

Gratis Hulplijn GMN Ministerie  
T: 0800 0888

**ZIKA - ST. MAARTEN INFORMATION POINT**

**Ministry of Health, Social Development  
and Employment**

Vineyard Office Park 3  
W.G. Buncamper Road 33  
Pondfill, Sint Maarten  
T: (+1721) 542 2078 / 542 3553 / 542 3003

Toll Free Helpline T: 550 2255 (550-call)