



MOSQUITOES: BUZZING, BITING, AND MAKING PEOPLE SICK!

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YOUNG REVIEWERS:



ARCADIA-
QUEST

AGE: 15



JOONSAH

AGE: 10

MOSQUITO-BORNE DISEASES

Illnesses that spread from one person or animal to another through the bite of an infected mosquito.

Mosquitoes—those small irritating insects that fly around and bite us on warm days—can also carry diseases that can make people very sick. Mosquitoes “bite” to suck blood from people and animals to feed their eggs. When a mosquito bites someone, it can also transmit a virus or parasite to that person. Mosquito-borne diseases are common in many parts of the world. Diseases carried by mosquitoes include malaria, dengue, and Zika. In this article, we will explain how mosquitoes transmit diseases and describe the main symptoms of several important mosquito-borne diseases. We will also tell you how both individuals and communities can protect themselves from mosquitoes and prevent these dangerous diseases.

BEWARE OF THE BUZZING BITERS!

Diseases transmitted to humans by mosquitoes, called **mosquito-borne diseases**, are serious health issues. They can make people very sick or even kill them. [The World Health Organization](#) says

HEALTH DISPARITIES

Differences in health that depend on the conditions where people are born, grow, live, study, and age.

PATHOGENS

Microscopic living things like viruses, bacteria, or parasites that can invade our bodies and make us sick.

that diseases transmitted by mosquitoes and other insects make up 17% of all infectious diseases in the world. They cause 700,000 deaths each year [1]. Mosquitoes are the most common type of insect when it comes to spreading diseases. Some mosquito-borne diseases include chikungunya, Zika, yellow fever, West Nile, Japanese encephalitis, dengue, and malaria.

Mosquito-borne diseases can affect public health and the economy [1]. When people get sick, it puts pressure on local healthcare systems. Sick people often cannot go to work, so this causes industries to be less productive and local economies to lose money. Limited resources and poor healthcare can make outbreaks of mosquito-borne diseases especially harmful in some places, and vulnerable groups, such as children, pregnant women, and poor people are often among the worst affected. This can make inequalities worse and increase **health disparities** [1]. To reduce mosquito-borne diseases and protect people's health, it is important to **prevent mosquito bites and control mosquito populations**.

HOW ARE MOSQUITO-BORNE DISEASES TRANSFERRED TO HUMANS?

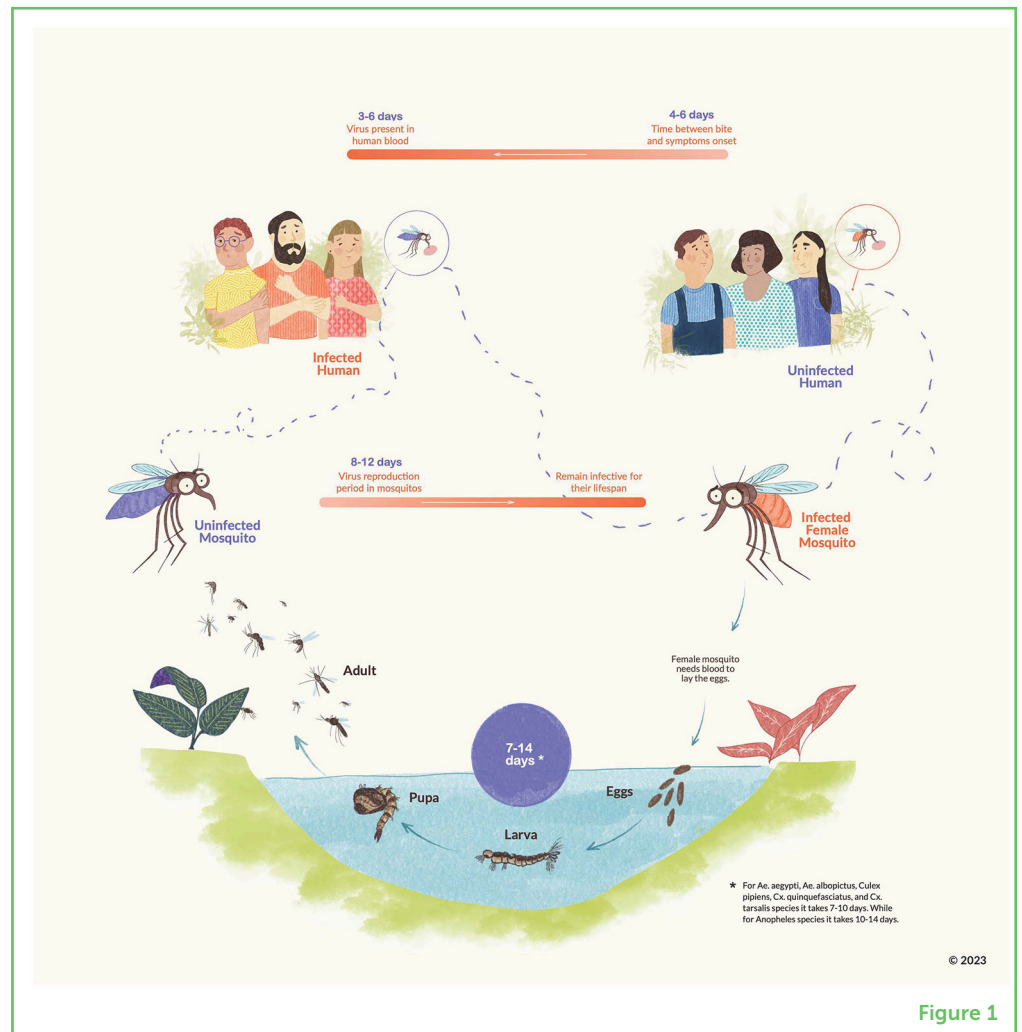
Mosquitoes are found worldwide, even in the Arctic [2], but they are especially common in warm, moist tropical and subtropical regions. There are about 3,500 mosquito species, with the most common being *Anopheles*, *Aedes*, and *Culex*. *Anopheles* transmits malaria and filariasis. *Aedes* transmits yellow fever, dengue, chikungunya, Zika, and yellow fever. *Culex* transmits West Nile, Japanese encephalitis, and filariasis [2]. But only a small number (3%) of mosquitoes spread diseases to people [1].

To get nutrients for their eggs, female mosquitoes feed on blood from humans and other animals (Figure 1). When they feed, they also inject saliva, which might contain disease-causing **pathogens** like viruses. In contrast, male mosquitoes mainly feed on nectar from plants. Some mosquitoes can be picky eaters, sticking to just a few species [2], but others are more flexible and will feed on mammals, birds, and reptiles. Mosquitoes that feed on humans and allow pathogens to multiply in their salivary glands can spread diseases to humans [2].

Mosquitoes lay eggs on water or other moist surfaces, including lakes, ponds, and swamps, and holes in trees (Figure 1). Humans also make trash that can hold water, like disposable bottles, cans, and old tires. More trash means more places for mosquitoes to breed [3]. People who do not have running water in their homes often store their water in open containers, which can also give mosquitoes a place to breed. *Aedes* mosquitoes, which are common in tropical areas, have spread this way [1]. These mosquitoes transmit a disease called dengue, which

Figure 1

Mosquito-borne diseases spread through a cycle that involves transmission of the virus from humans to mosquitoes and back to humans. First, an uninfected female mosquito bites an infected human. The virus reproduces in the mosquito's salivary glands for 8–12 days and then, when the mosquito bites an uninfected human, it can transmit the disease. Symptoms of the disease usually show up after 4–6 days. Female mosquitoes lay their eggs in water. When the eggs hatch, new mosquitoes can begin the disease transmission cycle again.

**Figure 1**

is spreading widely in the tropical world—even in areas where both *Aedes* mosquitoes and dengue were previously eliminated.

Humans can become infected with dengue when an infected female *Aedes* mosquito bites a person and sucks their blood. Mosquitoes get infected with dengue virus when they bite a person who has the virus. The virus reproduces in the mosquito for 8–12 days [2]. After that, the mosquito can transmit the virus to humans. Infected mosquitoes carry the virus, and can continue to infect people, for their entire lives—usually around 6 weeks [3].

HOW DO MOSQUITOES FIND THEIR VICTIMS?

Mosquitoes find their victims by sensing chemicals the animals breathe out and their body heat. Some people get bitten by mosquitoes more often than others. Many things can make a person more attractive to mosquitoes [4]:

- People with type O blood get bitten by mosquitoes more often.
- Mosquitoes like warm bodies. People who exercise or live in hot climates are more prone to being bitten.
- Mosquitoes like sweat because of the chemicals in it. People who sweat a lot are more likely to be bitten.
- Pregnant women get more mosquito bites than non-pregnant women. Pregnant women make more carbon dioxide and body heat. Mosquitoes like that.
- Certain medications, such as the one used to treat malaria, can attract mosquitoes.
- People with medical conditions like diabetes and kidney disease are more prone to mosquito bites.

WHAT DO MOSQUITO-BORNE DISEASES FEEL LIKE?

Malaria, dengue fever, and Zika are three examples of mosquito-borne diseases. We will briefly describe their symptoms below.

Malaria

Malaria can cause fever, chills, sweating, and flu-like symptoms. If not treated, it can cause brain damage, breathing issues, organ failure, and death. Malaria is caused by a parasite spread by certain mosquitoes of the species *Anopheles*.

Dengue

Dengue is a virus that can cause high fever, severe headache, rash, pain behind the eyes, joint and muscle pain, nausea, and vomiting. In some cases, it can develop into a more severe form that can be life-threatening, called dengue hemorrhagic fever. Dengue viruses are spread by *Aedes aegypti* and *Aedes albopictus* mosquitoes.

Zika

Zika is a virus that can either cause no symptoms or mild symptoms like fever, rash, joint pain, and red eyes. Pregnant women who get infected may face greater risks because Zika virus can cause disabilities in their babies. Mosquitoes that spread Zika are of the species *Aedes aegypti*.

PREVENTING MOSQUITO-BORNE DISEASES

People can protect themselves from mosquito bites to help prevent the spread of mosquito-borne diseases. People can also take steps to stop mosquitos from laying eggs nearby. To avoid mosquito bites, use mosquito repellent, wear long sleeves and pants, and use screens on windows and doors to keep mosquitoes out. To prevent mosquitoes from laying eggs nearby, remove any standing water near homes, so that mosquitoes do not have as many places to lay eggs.

VACCINATION CAMPAIGN

A large effort to give shots to many people at the same time to protect them from a specific disease.

Climate change is causing certain areas to become hotter and wetter [1, 3]. This can help mosquitoes thrive and even help them move to new locations, putting more people at risk of mosquito-borne diseases. This means that fighting climate change is another important step for preventing these diseases.

Preventing mosquito-borne diseases is important for public health. To keep people healthy, countries where mosquito-borne diseases are a problem might need to develop mosquito-control programs and **vaccination campaigns** for mosquito-borne diseases for which vaccines exist. Educating the public is also critical, to promote behaviors that reduce the risk of mosquito bites. Finally, as we mentioned, measures to protect the environment from further climate change are also important. If both individuals and health officials take the necessary steps to prevent mosquito-borne diseases, they will help to create a healthier world.

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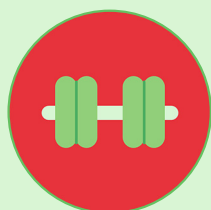
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YOUNG REVIEWERS

ARCADIAQUEST, AGE: 15

This group is made up of rowing children who are passionate about science. They also like sports such as tennis and football, but also music. Some of them play the piano. They speak English and German fluently.



JOONSAH, AGE: 10

Hi, my name is Joonsah. I am 10 years old. I like to play sports, such as soccer, tennis, and skiing. My favorite animal is a snake. I play three instruments: piano, viola, and trumpet. I also speak four languages: English, Korean, Chinese, and some German. I really like science too.



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