

What doctors want patients to know about mosquito bites

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AT A GLANCE: Mosquito bites are often known as a seasonal annoyance, but they can trigger reactions ranging from mild itching to serious allergic responses, and in many parts of the world, transmit life-threatening diseases. Here are key things you will learn about mosquito bites from Donald Lei, MD, MS, a dermatologist at Rush University System for Health, in this article:

- Mosquito bites itch because of an inflammatory response to proteins in mosquito saliva. Only female mosquitoes bite humans. Male mosquitoes feed on plant nectar.
- Reactions from mosquito bites can range from a small, raised bump to a condition called Skeeter syndrome, which involves extensive swelling, redness and sometimes fever.
- Certain symptoms after a mosquito bite, such as spreading redness, fever, swollen lymph nodes and difficulty breathing, require prompt medical evaluation.
- The most effective insect repellents to prevent mosquito bites contain DEET, picaridin or permethrin.
- Infants 2 months old or younger should be protected only with physical barriers such as long clothing and netting—not chemical insect repellents.

Mosquito bites are among the most universal human experiences, but the itch and bump they leave behind are the result of something more biologically complex than they appear. Every bite sets off an immune system response, and for most people, that response is mild and short-lived. For others, however, a single bite can trigger a strong local reaction—or, in some regions of the world, mark the beginning of a serious illness.

Present on every continent except Antarctica, mosquitoes can breed in even the smallest amount of standing water. Mosquitoes can thrive in the middle of a city, in a flowerpot or in a clogged gutter. Meanwhile, the diseases mosquitoes can carry, including malaria, Zika virus and West Nile virus, affect millions of people globally each year.

The AMA's What Doctors Want Patients to Know™ series gives physicians a platform to share what they want patients to understand about today's healthcare headlines.

In this installment, Donald Lei, MD, MS, a general dermatologist at Rush University System for Health, shared what patients should know about mosquito bites—from the immune reaction that makes them itch, to which symptoms should send someone straight to the emergency room.

[Rush University System for Health](#) is part of the [AMA Health System Member Program](#), which provides enterprise solutions to equip leadership, physicians and care teams with resources to help drive the future of medicine.

Mosquito bites are an immune system reaction

"Mosquito bites are an inflammatory response to proteins found in mosquito saliva," said Dr. Lei. "It's essentially your immune system recognizing something that isn't supposed to be in your body and reacting to it."



Donald Lei, MD

The itch that follows is a byproduct of that immune response.

“Mosquito bites itch due to the inflammatory cells that are stimulated and the molecules that are released as part of that process,” he said. “One very important contributor to itch from mosquito bites is the histamine pathway that is activated—something we commonly think of with hives and allergies—but we know that there are other pathways and other inflammatory molecules involved as well now.”

Only female mosquitoes bite

“Female mosquitoes bite humans for the protein in blood because mosquito eggs need this protein for development,” Dr. Lei said. “Male mosquitoes don’t drink human blood and actually sustain themselves from nutrient sources like plant nectar.”

The act of biting itself involves more than a simple puncture.

“When mosquitoes bite, they inject their saliva into your skin because it has compounds in it that expand blood vessels and prevent blood clotting to make it easier to drink your blood,” he explained.

Mosquitoes breed in standing water

“Mosquitoes are usually found near standing water because they need it to breed. Think ponds and wetlands,” Dr. Lei said. “However, studies have shown that some kinds of mosquitoes can even breed in extremely small amounts of standing water like flowerpots.

“This explains why you can still find mosquitoes even in densely populated cities where there is little standing water,” he added. “Environments that make it hard for mosquitoes to survive are those that are very dry like deserts, at very high altitudes, or are too cold year-round.”

Some people attract more mosquito bites than others

"The biggest risk is simply being outdoors with exposed skin during the times of the day that mosquitoes are the most active, which can vary by mosquito species, but is typically dusk to evening time," Dr. Lei said, noting "there are some species of mosquitoes that are more active during dawn as well."

Some personal factors may also affect who gets bitten by mosquitoes most.

"There are some odors or chemicals produced on the skin that attract mosquitoes more than others, some of which are produced by bacteria on the skin," he said. "But other factors, such as the amount of carbon dioxide produced or body temperature, seem to also have an impact on attractiveness to mosquitoes, which could explain why studies have shown that pregnant women are more likely to be bitten by mosquitoes."

Mosquitoes transmit disease through their saliva

"Mosquitoes can harbor numerous diseases and transmit them to humans through their saliva," said Dr. Lei. "In the U.S., these diseases are most commonly viral, such as West Nile Virus."

"Mosquito-borne illnesses vary significantly by geographic distribution," he explained. "For example, some of the other commonly known mosquito-borne illnesses are malaria—which is a parasite and is endemic to sub-Saharan Africa, Central and South America, and parts of Asia—or Zika virus, which was making headlines in 2016."

For 2026, the West Nile virus season has started early. This has been the highest number of West Nile virus infections reported at this point in the year since 2004, [according to the CDC](#).

Symptoms range from a small bump to Skeeter Syndrome

"Each person's response to mosquito bites can vary significantly depending on their immune system's reactivity to mosquito saliva," said Dr. Lei. "For most children and adults,

right after a mosquito bite, a hive, or 'wheal,' will typically appear within the first half hour and possibly last for a few hours.

“This is that more raised and puffier reaction in contrast to the smaller and firmer pink bump or papule that usually replaces it afterwards and lasts a few days before resolving,” he added. “Some people have a much more exaggerated response to mosquito bites called large local reactions or Skeeter syndrome.”

Skeeter syndrome “can present with very large areas of swelling, warmth and redness—sometimes many centimeters in diameter—and sometimes, but not always, with mild fevers,” Dr. Lei said. “Even more rare than this is a condition called severe mosquito bite allergy, or SMBA.

“People with this condition can experience very severe symptoms such as high fever, fatigue, enlargement of their lymph nodes, and mosquito bites that can turn dusky or black, blister, or form a hard, black scab on top,” he added.

Most bites need little to no treatment—but relief is available

“For most mosquito bites, you don't need to treat them. However, for symptom relief, you can apply cold compresses or ice packs,” Dr. Lei said. “There are also over-the-counter anti-itch creams that include pramoxine, and one of my favorite tricks is to keep these creams in the fridge and apply them cold for extra itch relief.”

“Other treatments that can be helpful include allergy pills like antihistamines,” he explained. “Nonsedating or second-generation antihistamines are preferred, such as cetirizine (Zyrtec) or fexofenadine (Allegra).”

“For more persistent or bothersome mosquito bites, your doctor may prescribe a topical steroid to be applied to the bite,” said Dr. Lei. “For more severe reactions, sometimes an injection of steroid directly into the mosquito bite may be done in-office, or a short course of oral steroids may be prescribed.”

Strong insect repellent can make a difference

"The best prevention is avoiding areas near standing water around the times that mosquitoes are the most active—usually dusk—and physical barriers like long sleeves and pants, and hats with mosquito netting," said Dr. Lei. People can also remove things like bowls, pots and other vessels from their yards that can hold standing water and be a breeding ground for mosquitoes.

"When that's not possible, there are a number of effective bug repellents. Look for products with DEET, picaridin or permethrin as these are the most effective and well-studied repellents," he said. "DEET and picaridin are only recommended for those over 2 months old. Infants under this age should prevent mosquito bites only with physical barriers like long clothing and mosquito netting."

"Permethrin should only be used to treat clothing and gear, and not directly on the skin because it gets metabolized and inactivated when on the skin, so it does not provide long-lasting activity," Dr. Lei explained.

Know when to contact your doctor

"Mosquito bites are typically self-resolving within a few days and, importantly, should not progressively worsen," Dr. Lei said.

Changes that should prompt medical evaluation—which may suggest infection or a mosquito-borne illness—include:

- Spreading redness and warmth after 24–48 hours.
- Pus or yellow discharge from the mosquito bite.
- Duskiness or black crusting at the mosquito bite.
- Blisters.
- Widespread rash.
- Swollen lymph nodes.
- Fevers or chills.
- Headaches.

- Confusion.
- Muscle aches.
- Joint pains.
- Neck stiffness.

"These symptoms should prompt you to seek immediate medical attention," Dr. Lei said, noting that specific warning signs include hives developing across the body—away from the site of the mosquito bite—difficulty breathing or swallowing, and swelling of the face, lips or tongue.