



## Monthly Medical Moment: May 2025

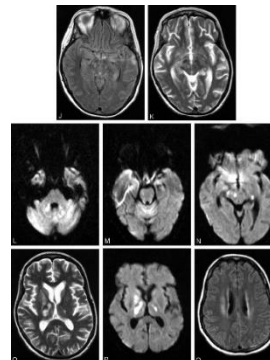
### Mosquito-borne Diseases: What's the Buzz

#### An overview of mosquito-borne diseases and prevention

The chances of a mosquito carrying a disease and transmitting it to a human are low...but never zero! Check out some of the mosquito-borne diseases that have been reported in the US. There are no specific medications to treat the following viruses, and antibiotics are not effective against viruses – treatment is supportive.

#### West Nile Virus (WNV)<sup>1</sup>

- Most people (8/10) infected do NOT develop any symptoms
- If symptoms develop, they generally develop 2-14 days from the mosquito bite:
  - 1 in 5 may develop fever, headaches, body aches, joint pains, vomiting, diarrhea, and rash with fatigue and weakness that can last for weeks to months
  - 1 in 150 may develop a severe inflammation of the brain (encephalitis) or the membranes surrounding the brain/spinal cord (meningitis), which could include paralysis, coma, convulsions, numbness, and vision loss, with prolonged recovery, permanent effects, or death (risk is higher in people aged 55 and above, with history of cancer, diabetes, hypertension, kidney disease, and history of organ transplant)
- May rarely be passed from person-to-person through blood transfusion, organ transplants, and mother to baby (pregnancy, delivery, breastfeeding)
- *In 2024, there were 98 human disease cases in New York, 23 cases in Maryland, 10 cases in Virginia, 2 cases in West Virginia (1,466 nationally)*



Brain MRI showing multiple areas of abnormalities related to a case of severe West Nile Virus<sup>2</sup>

#### La Crosse Virus<sup>3</sup>

- Most people infected do not develop symptoms. Initial symptoms (5-15 days from the mosquito bite) might include fever, headache, nausea, vomiting, tiredness, and lethargy
  - Individuals under the age of 16 are at highest risk for severe disease, including encephalitis, high fever, coma, seizures, vision loss, numbness, and paralysis. Risk of death is <1%.
- *In 2024, there was 1 human disease case in WV, and 0 human disease cases in NY, VA, and MD (35 nationally)*

#### Eastern Equine Encephalitis (EEE) Virus<sup>4</sup>

- EEE is rare - most people infected do NOT develop any symptoms
- If symptoms develop, they generally develop 4-10 days after the mosquito bite:
  - Some may develop fevers, chills, body aches, and joint pain which can last for 1-2 weeks
  - Some may develop inflammation of the brain (encephalitis) or the membranes surrounding the brain and spinal cord (meningitis). Approximately 1/3 who develop severe EEE die within 2-10 days; survivors may develop long-term physical or mental problems and disabilities
- *In 2024, there were 2 human disease cases in NY, and 0 in MD, VA, and WV (19 nationally)*

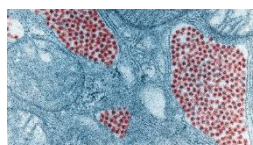
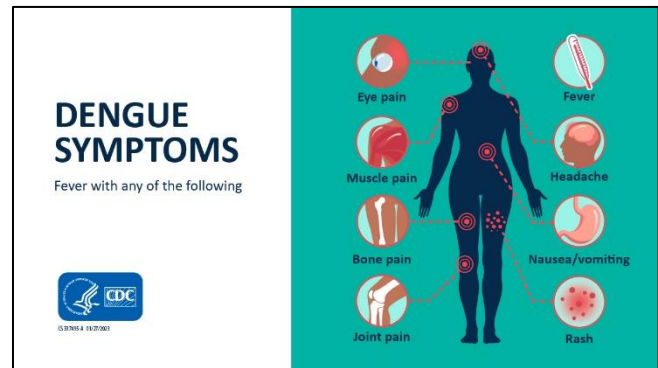


Image of numerous EEEV particles (red) in mosquito salivary gland tissue (blue)

### **Dengue Virus<sup>5</sup>**

- 40-80% of cases have NO symptoms
- If symptoms develop, they generally occur 3-10 days after the mosquito bite
  - 1 in 4 infected persons may become sick and experience pain behind the eyes, or in the muscles/joints/bones, nausea/vomiting, fever, bleeding, and rash, which can last for 2-7 days
  - 1 in 20 people who get sick with dengue may develop severe symptoms, including shock, internal bleeding, and death
- May rarely be passed from person-to-person through exposure to infected blood, organs, or other tissues (needlestick injuries, from mother to fetus during birth, sexual transmission)
- *In 2025 so far, there have been 14 human disease cases in NY, 5 in VA, 4 in MD, 0 in WV (all travel-acquired; 1466 cases of locally-acquired nationally)*



### **Chikungunya Virus<sup>6</sup>**

- Around 15-35% of people infected will have NO symptoms
- If symptoms develop, they generally occur 3-7 days after the mosquito bite:
  - Some may develop high fevers, and severe joint pains that last for months or longer (especially the hands and feet), conjunctivitis, headache, muscle aches, nausea, vomiting, or rash
  - Some may develop more serious symptoms, including hepatitis, inflammation of the heart, neurologic diseases, eye disease, kidney disease, and severe skin lesions. Deaths are rare
  - Risk is highest among travelers to tropical/subtropical regions, especially during rainy seasons, and for neonates exposed intrapartum or after birth, adults >65 years old, and those with underlying health conditions
- *Between 2014-2024, there were 13 locally-acquired cases. In 2024, there were 199 cases related to traveling outside of the US, and 0 locally acquired*



### **Zika Virus<sup>8</sup>**

- Since 2018, there have been no US locally acquired cases
- Most infected people will have NO symptoms, or after 3-14 days from the mosquito bite, mild symptoms like fever, rash, headache, joint/muscle pain, and conjunctivitis which can last for up to a week. Hospitalization and death are uncommon
- Rarely, it may cause series birth defects or other pregnancy complications (mother to fetus transmission), Guillain-Barre syndrome (immune-mediated damage of nerve cells), bleeding, or meningitis/encephalitis

### **St. Louis Encephalitis Virus<sup>9</sup>**

- There was 1 human disease case in 2024 (0 in MD, NY, VA, WV)
- Most infected people will not have symptoms. Symptoms may occur in 4-14 days from the mosquito bite, and may include fever, headache, dizziness, nausea, and weakness and may get worse over a week. Older adults are at higher risk for more severe symptoms, including encephalitis/meningitis, tremors, coma. With encephalitis, between 5-20% of patients die



### Bonus disease: Malaria<sup>10</sup>

- NOT a virus – it is caused by a parasite (*Plasmodium*) that is NOT endemic to the US (does not regularly occur or spread in the US), however the US reports around 2000 cases annually primarily related to travel to warm areas like sub-Saharan Africa, parts of Oceania, Central and South America, and Southeast Asia
  - In 2020, there were 72 cases in MD, 34 in VA, 16 in NY, 0 in WV
- Mosquitos that *can* carry *Plasmodium* are found in the US
- You can start feeling ill anywhere from one week to one year or more later! Symptoms range from mild (fever, flu-like illness, muscle aches, headache, tiredness, nausea, vomiting, diarrhea) to severe (anemia, jaundice, kidney failure, seizures, coma, death). Cases in the US are typically hospitalized for treatment
- There are medications to treat and prevent malaria, but depend on type of *Plasmodium*, where the infection happened, age, pregnancy status, and symptoms – speak to a healthcare provider before taking



A patient suffering from jaundice, or yellowing (in this case of the eye and surrounding facial skin), caused by malaria (Sue Ford, Science Photo Library)

### Ways to Prevent Mosquito Bites<sup>11-13</sup>


**Insect repellants:** always follow label instructions, and **apply sunscreen first** to give it time to absorb (around 15 minutes) – insect repellant can reduce the sun protection factor of some sunscreens. The ability for repellants and sunscreens to be effective rely on their ability to be **on the skin** - applying sunscreen first may help prevent additional body absorption from the skin of DEET-based repellants.

Products that are registered with the EPA and known to be effective:

**EPA-registered active ingredients**

Higher percentages of active ingredient provide longer protection

- DEET
- Picaridin (known as KBR and icaridin outside the US)
- IR3535
- Oil of lemon eucalyptus (OLE)
- Para-menthane-diol (PMD)
- 2-undecanone



Find the insect repellent that's right for you by using [EPA's search tool](#).

The EPA's search tool is available at: [www.epa.gov/insect-repellents/find-insect-repellent-right-you](https://www.epa.gov/insect-repellents/find-insect-repellent-right-you)

**Gear:** wear long-sleeved clothing, and treat or buy pre-treated items like boots, pants, socks, and tents with permethrin. Do not use permethrin directly on the skin.

**Source control:** keep windows/doors shut, use window/door screens, empty items that could hold water once weekly, tightly cover water storage containers; if using insect spray/foggers, follow label instructions.

There are many diseases spread by different mosquitos. The most common mosquitos and the diseases they *may* carry as reported by state departments of health are:

### Virginia<sup>14</sup>



*Culex pipiens* (common house mosquito, 57% of trapped mosquitos): West Nile Virus (WNV) (as of 2019, <2% of mosquitos were positive)



*Culiseta melanura* (black-tailed mosquito, 20% of trapped mosquitos): Eastern Equine Encephalitis (EEE) (as of 2019, <0.40% of mosquitos were positive)



*Aedes albopictus* (Asian tiger mosquito, 17% of trapped mosquitos): WNV, Chikungunya, Dengue, Zika virus, La Crosse Virus

### Maryland<sup>15</sup>



*Aedes* and *Ochlerotatus* species, *Coquillettidia perturbans* (pictured): EEE  
*Aedes albopictus*: WNV  
*Culex* species: WNV, St. Louis encephalitis (SLE)

### West Virginia<sup>16,17</sup>



*Aedes triseriatus* (pictured), *japonicus*, and *albopictus*: La Crosse Encephalitis  
*Culex* species: WNV



*Anopheles* species: malaria

*Aedes aegypti*, *Aedes albopictus*:  
Dengue/Chikungunya/Zika virus

*Aedes*, *Coquillettidia*, and *Culex* species: EEE



*Culex pipiens*, *Culex quinquefasciatus* (pictured): SLE

### New York<sup>18</sup>

Diseases reported: WNV, EEE, Chikungunya Virus, Dengue, Malaria

# National Aeronautics and Space Administration Goddard Space Flight Center Health Units



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