

## Mosquito-borne Diseases in Maine

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## Endemic Mosquito-borne diseases

- Eastern Equine Encephalitis
  - One of the most serious mosquito-borne diseases in the United States
  - Many persons infected will have no obvious symptoms
- West Nile virus
  - Occurs throughout the United States
  - Many persons infected will have no obvious symptoms



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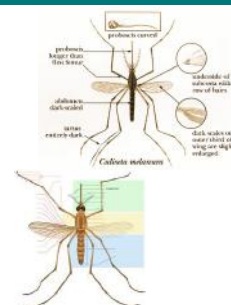
## Eastern Equine Encephalitis

- Most serious arbovirus in the United States
  - Approximately 1/3 of those infected will show no symptoms
  - Of the 2/3 that show symptoms, 1/2 will die
  - Of those that don't die, many will have permanent neurological damage
- Estimated cost of a single human case of EEE
  - \$21,000 for mild, transient illness
  - \$3 million for individuals who suffer permanent neurologic damage

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## Mosquito Species

- 45 mosquito species in Maine, however less than half are considered to be likely vectors for EEE and WNV



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## EEE vector habitat

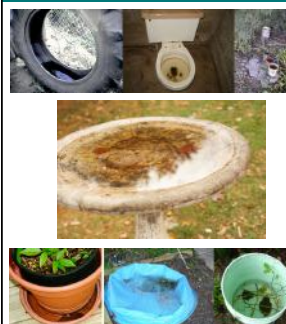


Photo courtesy of Kim Foss, Swamp Inc

- *Cs. melanura* primary vector of EEE
- Bogs and swamps
  - Mature hemlock, immature red maple, yellow birch, beech, winterberry, shrubs
  - Clear or tea colored water
  - Peat bottom
  - Acidic
- Early emergence in spring, overwinter as larvae, multiple generations
- Also WNV competent
- Primarily bird biters

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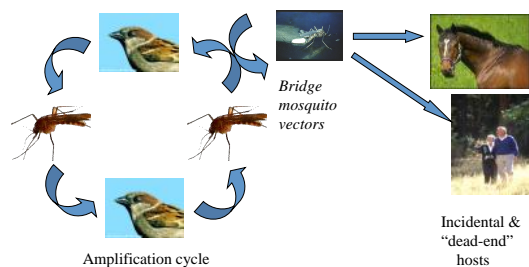
## WNV vector habitat



- Cx. pipiens/restuans*  
 common WNV vector
- Artificial containers
    - Catch basins
    - Flower pots
    - Discarded tires
  - Stagnant temporary pools
  - Holes in trees
  - Multiple generations
    - Can overwinter as adults
  - Generalist feeders

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## EEEV and WNV Transmission Cycle



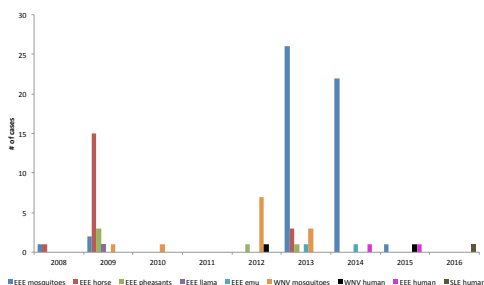
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## Symptoms of Arboviral Illness

- MOST people infected with an arbovirus will not have symptoms
- Symptoms can be very mild to very severe and appear 3-18 days after infection
  - Mild
    - Fever
    - Head and body aches
    - Lack of energy
  - Neuroinvasive Disease
    - Central nervous system involvement
    - Stiff neck, altered mental status, inflammation of the brain, respiratory distress, paralysis, coma, death
- Symptoms usually last 1-2 weeks, no treatment, only support

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## Arboviruses in Maine, 2008-16



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## Travel Related Arboviruses



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## Most common travel-related arboviruses

- **Chikungunya**
  - Fever and joint pain
  - Headache
  - Muscle pain
  - Joint swelling
  - Rash
- **Dengue**
  - High fever AND
  - Severe headache
  - Severe eye pain
  - Joint pain
  - Muscle and/or bone pain
  - Rash
  - Mild bleeding manifestation
- **Zika**
  - Fever
  - Rash
  - Joint Pain
  - Conjunctivitis
- Most people infected with Zika won't have symptoms or will only have mild symptoms
- **All carried by *Aedes aegypti/Aedes albopictus* mosquitoes**

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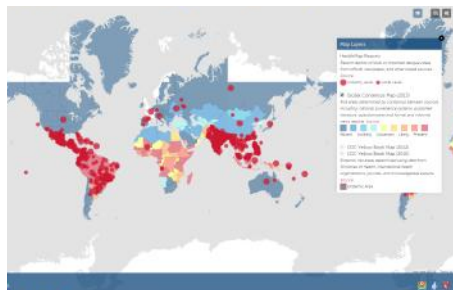
## Countries and territories where chikungunya cases have been reported



As of April 22, 2016

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## DengueMap



Maine Center for Disease Control and Prevention Data as of October 31, 2016

## Areas with Active Zika Transmission



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## Travel- Related Arboviral Transmission

- Through mosquito bites
  - Primarily *Aedes aegypti* species, *Aedes albopictus* also considered a competent carrier
  - Humans are the reservoir
- Zika only
  - Also through sexual contact

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## Zika Complications

- Infections in pregnant women linked to microcephaly



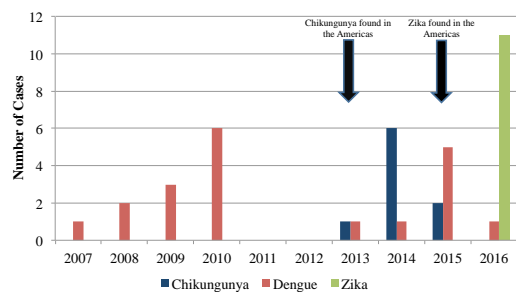
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## Updated mosquito range maps



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## Travel Related Arboviruses in Maine residents 2007-2016\*



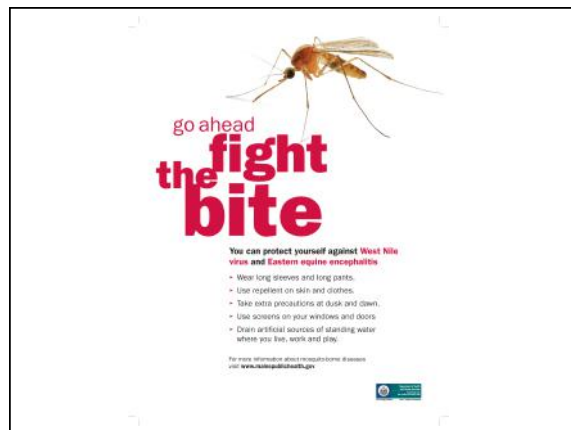
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\*Data as of October 31, 2016

## Summary

- Arboviruses are a concern in Maine, both locally acquired and travel related
- Maine is detecting more arboviruses than ever before
- Arboviruses can have severe consequences
- Mainers should take care to prevent mosquito bites – both at home and abroad

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## For More Information

- Maine CDC disease reporting and consultation line: 1-800-821-5821
- Maine Medical Center Research Institute – Vector-borne Disease Lab: 207-396-8246 [ticklab@mmc.org](mailto:ticklab@mmc.org)
- UMaine Cooperative Extension: 207-581-3880
- Maine CDC Vector-Borne Disease Website: <http://www.maine.gov/dhhs/mecdc/infectious-disease/epi/vector-borne/index.shtml>
- [Disease.reporting@maine.gov](mailto:Disease.reporting@maine.gov)



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