Zika Virus Disease

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Northeastern Region Lyme Disease and Zika Training
April 29, 2016
Objectives

- Discuss the role of mosquitoes in transmitting and maintaining Zika virus in the environment.
- Relate the biology of individual mosquito species to Zika virus epidemiology.
Zika virus

- Single stranded RNA virus
- Belongs to the virus family Flaviviridae genus *Flavivirus*
  - Yellow fever virus
  - Dengue virus
  - Japanese encephalitis virus
  - West Nile virus

- Transmitted to humans primarily by *Aedes* (*Stegomyia*) mosquitoes
  - Sexual transmission and perinatal transmission of the virus have also been documented
Zika Transmission Cycle

Sylvatic (jungle) cycle

Epidemic (urban) cycle

Source: CDC
Zika Mosquito Vectors

- *Aedes aegypti* (also known as the yellow fever mosquito)
- *Aedes albopictus* (also known as Asian tiger)
- Both mosquito species also transmit dengue virus and chikungunya virus
- *Aedes albopictus* is also a competent vector for La Crosse virus
- Only female mosquitoes transmit diseases
Mosquito Vector Geographic Distribution

Aedes aegypti

Aedes albopictus

Source: CDC
Mosquito Vector Geographic Distribution

Ae. albopictus Distribution in West Virginia

Distribution of *Aedes albopictus* – West Virginia, 2010-2015

Sources: Esri, HERE, DeLorme, Intermap, increment-P Corp., GEBCO, USGS, FAO, NPS, NRCan, GEOLAND.COM, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Aedes aegypti and Aedes albopictus feed on human blood.
*Aedes aegypti* and *Aedes albopictus* lay eggs in natural and artificial water containers near human habitat.
- *Aedes aegypti* and *Aedes albopictus* will enter human dwellings.
**Aedes aegypti** and **Aedes albopictus** are active during the daytime.

Hourly captures of *Ae. aegypti* landing on man

Aedes albopictus are active during the daytime

Daily dynamics of host-seeking activity in Ae. albopictus females from Yaoundé, Cameroon (April-July 2009)

Personal Protection Against Bites

- Long-sleeved shirts and long pants
- Head nets
- Window screens
- Reduce activity during peak mosquito activity
- Mosquito repellents
Personal Protection Against Bites

- Mosquito Repellents
  - DEET
  - Picaridin
  - Oil of lemon eucalyptus
  - IR3535
Pest Management (Habitat Modification)

- Tire and container disposal
- Natural container elimination
West Virginia Department of Environmental Protection Rehabilitation Environmental Action Plan (REAP) Tire Collection Events

- [www.dep.wv.gov/dlr/reap/tires/Pages/TireCollectionEvents.aspx](http://www.dep.wv.gov/dlr/reap/tires/Pages/TireCollectionEvents.aspx)
- Hancock County Recycling Center: 8:00 am – 2:00 pm daily

Community Cleanup Activities
Pest Management

If there is a Zika case in West Virginia

- Minimize contact between vectors and suspected or confirmed human Zika cases, especially during first week of illness.

- Eliminate mosquito larval habitats 100-200 yards/meters around case’s home.

- Treat the outdoors with adult pesticide 100-200 yards/meters around case’s home.

- Educate the community about personal protection against mosquito-borne disease.
Mosquito Surveillance

- Initiate mosquito surveillance to determine mosquito abundance
  - Oviposition traps
  - Mosquito dippers
  - CDC light traps
  - BG Sentinel traps
  - Aspirators
Summary

- *Aedes aegypti* and *Aedes albopictus* like being near human habitats, encouraging transmission of diseases like dengue fever, chikungunya, and Zika to humans.

- Zika virus can be managed by understanding the biology of its mosquito vectors.