Mosquito Surveillance/Control in Texas

Infectious Disease Taskforce
Austin, Texas, May 6, 2016
Tom J. Sidwa, DVM, MPH
State Public Health Veterinarian
Zoonosis Control Branch Manager
Objectives

• Mosquito surveillance and control
• DSHS surveillance for arboviral diseases
• Zika virus vectors: Plans for improving distribution maps for *Aedes aegypti* and *Ae. albopictus* (*Stegomyia*)
• Recommendations to support vector control activities
• Arbovirus outbreak response triggers
• Entering private property for vector control
• Arbovirus outbreak response
Mosquito Surveillance and Control Infrastructure

• Local capacity
  – Range of services
    • No capacity
    • Surveillance activities only
    • Control activities only
    • Comprehensive surveillance and control activities

• State role limited to technical consultation, limited financial support, and laboratory services
Mosquito Surveillance and Control Infrastructure

• Mosquito Control Districts
  – 15 listed by the Texas Mosquito Control Association
    • 14 county-level
    • 1 city-level

• Other entities may also conduct mosquito surveillance and/or control activities
  – Environmental health agencies
  – Local health departments
  – County precincts, public works departments, etc.
~ 60 submitters from ~ 40 counties
Mosquito Collection and Submission
Laboratory Testing

• DSHS laboratory; certain local health department and private laboratories
  – Identify mosquitoes by species
  – test for medically-important arboviruses in vector species

• Various data sets are not centrally compiled at DSHS
  – comprehensive, statewide data difficult to obtain
Medically Important Arboviruses in Texas

- West Nile virus (WNV)
- St. Louis encephalitis virus (SLE)
- Dengue
- Western equine encephalitis virus (WEE)
- Eastern equine encephalitis virus (EEE)
- Venezuelan equine encephalitis virus (VEE)
- California group viruses (CAL)
- Tensaw (TEN)
- Highlands J virus (HJ)
- Travel-associated cases of other arboviruses, such as chikungunya and Zika
DSHS Arbovirus Laboratory Testing

• Year round mosquito identification
• Cell culture for broad based surveillance
  – Detects a wider variety of arboviruses
• PCR testing will be available for Zika virus
  – Likelihood of detection in mosquitoes very low
  – Use will be limited based on consultations between local jurisdiction, Region, and DSHS Central Office

• DSHS began testing mosquitoes for arboviruses during the first full week of May
Subgenus *Stegomyia*

Both are invasive species that are firmly established

2 hours after sunrise and several hours before sunset are usually the optimal activity periods for these species, but can be active (and taking blood meals) anytime during the daylight hours.

Flight range of both species is limited to approximately 200 meters from emergence.

*Ae. aegypti* females take blood meals from humans exclusively; *Ae. albopictus* has a broader host range.

Cavity breeders (in evolutionary past); use artificial, water-holding containers for oviposition

Synathropophilic: close association with humans

*Ae. aegypti* is the more efficient vector potential: multiple blood meals/gonotrophic cycle

![Asian tiger mosquito *Aedes albopictus*](http://fmel.ifas.ufl.edu/research/exotic.shtml)

Yellow fever mosquito *Aedes aegypti*  
Asian tiger mosquito *Aedes albopictus*
Inoculations performed in BSL3 suite
IFA results

Photographs of negative fluorescent antibody test used to identify viruses - Left side

Photographs of positive fluorescent antibody test used to identify viruses - Right side
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*Combined pool of *Ae. albopictus* and *Ae. triseriatus*
Arbovirus Positive Mosquito Pools - 2015

- SLEV Detected
- WNV Detected

Mosquito Testing:
- DSHS testing
- In-house testing
- Both DSHS & In-house testing
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*California encephalitis/meningitis refers to all California serogroup viruses. California serogroup includes California encephalitis, Jamestown Canyon, Keystone, La Crosse, Snowshoe Hare, and Trivittatus virus
Arbovirus Activity*
2015
Report Date: December 8, 2015

*Arbovirus activity in a county is indicated on the map by any of the following: bird, mosquito pool, sentinel chicken, horse, human or presumptive viremic donor
Documented presence of *Stegomyia* species in Texas 2000-2016

- **Aedes albopictus**
- **Aedes aegypti**
Zika Virus Vectors: Plans for Improving Distribution Maps

- Use ovitraps to surveil for *Stegomyia*
- Submitters must be recruited and provided materials and instructions for submission
- Ship eggs to one of the participating laboratories
- Eggs will be reared to adults and speciated
Plans for Improving Distribution Maps

• Procedures and logistics are being established
  – Mechanism for appropriate notification of local jurisdictions will be established prior to implementation

• First priority will be given to counties for which there are no data on the presence of *Stegomyia*

• Leveraging this process by adding pesticide resistance testing is being discussed
Arbovirus Outbreak Response

• During public health emergency, follow ICS process to request resources
  – DSHS Vector Control Response Operating Guidelines
  – Documenting needs is critical

• Local jurisdictions may access DSHS contract with vendor(s) for vector control services
  – Aerial application
  – Ground-based application (contracting in process)
Additional resources

- DSHS Zika information: http://www.texaszika.org
- Travel notices: http://wwwnc.cdc.gov/travel/notices
- DSHS zoonosis information: http://www.texaszoonosis.org
QUESTIONS?