Coordinating a Centralized Arbovirus Surveillance Program

Robert Cartner – Medical Entomology Lab
Why a centralized, statewide arbovirus surveillance program?
South Carolina Mosquito Control Program Support Levels

Mosquito Control Program Support Levels
Level 1: Minimal or No Resources
Level 2: Little to Moderate Resources
Level 3: Moderate to Full Resources

Program Office - Lake Mgt. Locations
- Level 3 - County Office
- Level 2 - City/Town Office
- Level 2 - City/Town Office - Within boundaries
- Level 2 - Lake Greenwood Shoreline
- Level 3 - Duke/Santee-Cooper Lakes Shoreline

Mosquito Control Program Coverage Areas
- Level 1 - No City/County Resources
- Level 2 - City/Town Program
- Level 2 - Community Program
- Level 2 - County or Lake Mgt. Program
- Level 3 - County or Lake Mgt. Program

May 2016
SC DHEC Arbovirus Surveillance History

- 1996 – SC DHEC Arbovirus beginning
- 2001 - ELC Grant funding and arrival of WNV in South Carolina
- 2013 – DHEC “shake-up”
City And DHEC Step Up Mosquito Efforts After Local Man Found To Have Probable Case Of West Nile Fever

A Dillon County man has been found to have a probable case of West Nile fever, marking the first human case of West Nile fever in South Carolina this year, the state Department of Health and Environmental Control reported Friday.

The middle-aged patient died last month of other causes, and tests conducted by DHEC’s Laboratory for Public Health showed that the patient probably had West Nile fever, which does not cause the death.

With a probable human case of West Nile virus and a death just one that week positive for West Nile virus, public health officials are working to address community concerns in Dillon County.

“Dillon County residents can rest easy knowing that our health officials here in South Carolina are working to address community concerns,” said Dr. William F. Cohn, senior special assistant to the director for DHEC’s Public Health Environmental Health. “Officials here have been conducting mosquito spraying and surveillance activities in Dillon County since September 6.”

Officials are also working to educate the public on how to protect themselves and their property from mosquito-borne diseases.

RICHARD TURNER of DHEC discusses the mosquito issue with city employees before they went on a city-wide survey on Wednesday morning. (Photo by Betty Fakih/My Dillon Herald)

“People should be aware that the virus is still out there and cases could reoccur,” Turner said. “They’ve been spraying all year and increasing spray as mosquito control activities increase.”

“People are encouraged to keep their garbage cans clean and lids on to help prevent mosquitoes from breeding,” Turner said.

“People are also encouraged to use repellent and wear long sleeves and pants when outdoors to help protect themselves from mosquito bites.”

For more information on West Nile virus, visit www.dhec.sc.gov/westnile or call 800-722-7600.

DHEC . . . (Continued From Page 1A)

Another Dillon County resident who tested positive for West Nile virus this week is in stable condition, and officials are working to control the mosquito population in the area.

“This is the first case in Dillon County, and we’re working to control the mosquito population,” Turner said. “We’re using a variety of methods to control the mosquitoes, including spraying and using larvicide.”

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Turner said surveillance efforts by DHEC staff continue to monitor the situation. Residents who find standing water and larvae are encouraged to report them to the Environmental Health Office in their county. Information on West Nile virus can also be found on the DHEC’s Web site at www.dhec.sc.gov.
Today:
Arbovirus Surveillance Program Staff

- Dr. Chris Evans
  - State Public Health Entomologist
- Robert Cartner
- Travis Shealy ("Adjunct" Vector Specialist Coordinator)
DHEC Vector Specialists

- 22 Vector Specialists
- Covering 19 counties (routine surveillance)
- Can be deployed as needed (limited to work area though)
Non-DHEC Arbovirus Surveillance Partners

- 8 mosquito control programs and 1 Lake Impoundment
  - Beaufort County
  - Charleston County
  - City of Hartsville
  - City of Newberry
  - City of North Myrtle Beach
  - Florence County
  - Georgetown County
  - Richland County
  - Santee Cooper
- More diverse collection locations using gravid traps, CDC light traps, BG Sentinel traps, aspirator, and EVS traps
Training Vector Specialists

- Who is using the traps?
- What is a mosquito trap?
- When do you set and collect a mosquito trap?
- Where do you set a mosquito trap?
- Why do we trap and why does a trap work?
- How does a trap work?
Outfitting a Surveillance Program: Equipment
Outfitting a Surveillance Program: Consumables
Equipment Repair
Interagency Mail Service (IMS)

- Overnight shipping
- Access to majority of agency offices
Mosquito Shipping Box

Blue labels and border to distinguish from boxes carrying animal heads
Shipping Labels

From
WNV Mosquito Surveillance Coordinator
SC DHEC RICHLAND COUNTY

RUSH TO
Bureau of Laboratories
South Carolina Department of Health and Environmental Control
8231 Parklane Rd
Columbia, SC 29223

Attn: Virology or Medical Entomology - Mosquitoes

FROM:
Bureau of Laboratories
SC DHEC
8231 Parklane Rd
Columbia, SC 29223

RETURN TO:
ROBERT CARTNER
SC DHEC RICHLAND COUNTY
C/O SC DHEC BUREAU OF LABORATORIES
8231 PARKLANE RD.
COLUMBIA SC 29223

Notify to pick up this package. Do not unpack ice packs.
(803) 896-0940; cartnerl@dhec.sc.gov
Mosquito Shipping Box
## Mosquito Collection Information Form

### Location of Mosquito Collection Site
- **County:**
- **County #:**
- **City/Town:**
- **ZIP Code:**
- **Site Name:**
- **Specific Location or Street Address:**
- **Coordinates (decimal degrees):**
  - **(X):**
  - **(Y):**
  - **(Lat):**
  - **(Lon):**
- **Level 3 Ecoregion:**
- **Level 4 Ecoregion:**

### Traps
- **Date Traps Were Run (mm/dd/yyyy):**
- **Number of Traps Submitted:**
- **Number of Traps Picked Up by Collector:**
- **Number of Nights Traps Operated:**
- **# of Petri Dishes:**
  - **Type of Trap:**
    - CDC Light Trap
    - CDC UV Light Trap
    - Key-Prince
    - SG
    - Gravid
- **Sample Storage:**
  - On Dry ice or in -80°C Ultra-low freezer
  - On ice packs in 4°C freezer
  - No cold chain kept
- **Notes:**

### Land Owner (Contact Person for Site Location)
- **Name:**
- **Street Address:**
- **City:**
- **State:**
- **ZIP Code:**
- **E-Mail:**
- **Phone:**
- **FAX:**

### Collector (Name of the person who performed the collection)
- **Name:**
- **Street Address:**
- **City:**
- **State:**
- **ZIP Code:**
- **E-Mail:**
- **Phone:**
- **FAX:**

### Habitat (Check all that apply)
- **Urban**
- **Rural**
- **Forest**
- **Edge of Forest**
- **Open Area**
- **Pond/Lake**
- **River/Stream**
- **Ground Pools**
- **Ditches**
- **Freshwater swamp/marsh/bog**
- **Salt Marsh**
- **Containers Nearby**
- **Other Habitat Type(s):**

### Temperature
- **High:**
- **Low:**

### Comments

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Run gravid traps for a minimum of 4 consecutive nights and a maximum of 5 consecutive nights. Run light traps for 1 night. **Turn in your collection immediately after your trapping cycle.**
Mosquito Shipping Box
Mosquito Samples

Richland Co. (40)
Columbia
8231 Parklane Rd

Gravid Trap X 4
1 May – 4 May 2017
R. Cartner
Trapping Frequency

• Traps set March – November
  • Start and end date depend on weather and temperature
• VecSpecs are asked to trap at least one week a month, and two weeks during July, August, and September (peak WNV season)
• Schedule is created to keep too many samples from coming in at one time
2017 Trapping Location Summary
Gravid Traps (2017)

Gravid Traps

NumberTrap *

- 1
- 2
- 3
- 4

*Traps per night
BG Sentinel 2.0 Traps (2017)

BGS Traps
Number of Traps *

- 1
- 2
- 3

*Traps per night
CDC Light Traps (2017)

CDC Light Traps
NumberTrap *
- 1
- 2
- 3
- 4

*Traps per night
Aspirator and Fay-Prince Traps (2017)

*Traps per night
Arbovirus Testing Process

• Mosquitoes identified to species and pooled
• Sent to Virology laboratory for testing
• Mosquito pools screened by cell culture and/or RT-PCR
  • Process is being refined for 2018
• Testing needs to be efficient, but also thorough
Notification of Positive Test Results

- Process more complicated after arrival of Zika
  - Notification is sent to DHEC Health Director (HD) in affected region
    - Disseminated downward through DHEC region
- HD notifies county and/or city
- Medical Entomology provides suggestions for control zones
Interactive Case Map

Operational layers

- SCDHEC Mosquito-Borne Disease Cases and Number of Animals Tested
- Confirmed Cases for 2017 - View one map at a time.
- All Cases by County
- Birds - West Nile Cases
- Mosquitoes - Flavivirus Cases
- Mosquitoes - West Nile Cases
- Veterinary Animals - Eastern Equine Encephalitis Cases
- Veterinary Animals - West Nile Cases
- Birds Tested for Mosquito-Borne Disease
- Mosquitoes Tested for Mosquito-Borne Disease
- Veterinary Animals Tested for Mosquito-Borne Disease
- County

https://gis.dhec.sc.gov/mosquitoborne/
Dead Bird Drop Off

- Interactive map for finding drop-off locations
  - https://gis.dhec.sc.gov/West Nile/
- Staff can pick up birds if drop-off isn’t possible
- Birds are tested in-house
Veterinary Animal Testing

• Contract with Clemson Veterinary Diagnostic Center (CVDC) for WNV and EEE testing of veterinary animals
Program Goals

• Initiate mosquito rearing program
• Initiate pesticide resistance testing program
• Initiate *Ae. aegypti* and *Ae. albopictus* egg surveillance program
• Increase statewide surveillance program
Program Benefits

• Building relationships with local mosquito control programs
• Building relationships with county and city governments
• Monitoring species habitats and ranges
• Recognizing species range increases
  • *Ae. j. japonicus*
  • *Cx. coronator*
  • *Ma. titillans*
Thank You!

Contact Info
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Cell: (803) 609-6814