ARBOVIRAL SURVEILLANCE PROTOCOL (MOSQUITOES)
2006 Season Guidance

(Note: This guidance may evolve during the season. Please make sure you have the most current recommendations.)

Public Health Action

1. Educate the public about arboviruses, especially regarding elimination of mosquito breeding sites and use of personal protective measures

2. Educate government officials at all levels regarding mosquito surveillance and integrated pest management (IPM) as a means of preventing cases of arboviral disease

3. Report all complaints from the public of intense mosquito activity to the public health entomologist at the West Virginia Infectious Disease Epidemiology Program (IDEP).

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4. Investigate confirmed cases of West Nile Virus (WNV), Eastern Equine Encephalitis (EEE), La Crosse Encephalitis (LAC), and Saint Louis Encephalitis (SLE) in animals (birds and horses) and humans by:

   A. Contacting a public health entomologist at IDEP

   NOTE: After contacting a public health entomologist, additional help can be obtained from one of six designated county or regional health departments:

      a. Mid-Ohio Valley Health Department (Elizabeth Green)
      b. Kanawha-Charleston Health Department (Anita Ray)
      c. Jefferson County Health Department (Arletta Lancaster)
      d. Nicholas County Health Department (Patty Rodgers)
      e. Cabell-Huntington Health Department (Stan Mills or Beverly Spurlock)
      f. Mercer County Health Department (Doris Erwin)

   B. Performing a site visit to the homes (or area) of all confirmed arboviral cases (animal or human) to visualize the environment for mosquito breeding habitat

   C. Interviewing the case (or guardians) to obtain information on the location of potential exposures, time of day when they are outdoors, time of day they believe mosquitoes are active in their area, and include a travel history during the incubation period, and document this information using the IDEP mosquito surveillance field form (page 3)
This interview will help you to decide where to look for mosquito habitats and to conduct surveillance.

D. Educating (pamphlets, information sheets, or news spots) the local population and civic leaders about removal of containers, mosquito habitat abatement, and use of personal protective measures, including use of mosquito repellent. Educational resources available at:

Mosquito Problems Start at Home (flyers)

Mosquitoes you your children (brochure)

La Crosse, Treehole Mosquitoes and West Virginia Children (brochure)

Mosquito Problems Start at Home (Brochure)

[http://www.wvdhhr.org/IDEP/a-z/a-z-wnv.asp#GeneralInfo](http://www.wvdhhr.org/IDEP/a-z/a-z-wnv.asp#GeneralInfo)  
General information on WNV

E. Recording recommendations made to the case or guardians on the [mosquito surveillance field form](#) (page 3)

F. Conducting [mosquito surveillance](#) (within one week of a confirmed case) at home or area where the case of arboviral disease occurred by:

   a. [Collecting](#) (for at least one trap night) and [identifying](#) adult mosquitoes, and [submitting mosquito pools](#) to the West Virginia Office of Laboratory Services (OLS) for arbovirus testing

      i. Adult mosquito sampling is to be done using two methods:
         1. [CDC light traps](#) using dry ice or CO2 from tanks
         2. [gravid traps](#) using a hay emulsion bait

   b. [Collecting](#) and [identifying](#) larval mosquitoes in the lab

      i. Larval mosquito samples can be collected and identified by using various methods, for example:

         1. Collecting
            a. Dipping from containers
            b. Emptying containers
            c. Suctioning using a turkey baster

         2. Identifying
            a. [Rearing](#) to adults
            b. [Identifying](#) 4th instar larvae

Note: For further information on how to collect, identify, and submit mosquitoes to the OLS see the [West Virginia Mosquito Surveillance Plan](#). Additional information can be found at:
G. Obtain latitude and longitude of the area where the case occurred (note what reference datum you are using on the GPS and record on the mosquito surveillance field form).

H. Follow-up site visit with correspondence to case or guardians that summarize the results of surveillance/testing and recommendations using the mosquito surveillance results and recommendations form and attach to the mosquito surveillance field form.

I. Forward copies of all forms (surveillance and results and recommendations) related to cases to the public health entomologist, along with voucher specimens of adult and larval mosquitoes.

J. If additional resources become available:
   a. establish local or regional mosquito surveillance and control capacity, and
   b. Establish educational regime through newspaper and news spots that occur seasonally

Prevention Objectives

1. Reduce disease risk through public education to encourage:
   A. use of personal protective measures
   B. elimination of mosquito breeding sites
   C. general understanding of mosquito biology

2. Reduce disease risk through development of local or regional mosquito surveillance and control capacity in conjunction with the Public Health Entomologist at IDEP as more resources become available.

Surveillance Objectives

1. Determine where arboviruses are prevalent in West Virginia and the extent of spread

2. Estimate the intensity of arbovirus activity in West Virginia

3. Develop and understanding of the seasonality of arbovirus activity in West Virginia
4. Determine which species and their distribution, seasonal patterns, and habitat preferences are key in the transmission of arboviruses in West Virginia, and to maintain a statewide mosquito species distribution list and voucher collection, through the aggregation of surveillance data at a state level and the submittal of voucher specimens to the state public health entomologist from mosquitoes collected as part of local surveillance activities.

5. Supply information needed to recommend and guide mosquito control measures and operations and to evaluate control methods and operations

**Disease Control Objectives**

1. Prevent an increase in or show a reduction of the number of arboviral cases in humans through
   a. Education of the public and government agencies
      i. Personal protective measures
      ii. Mosquito habitat reduction
      iii. General mosquito biology
   b. Focusing mosquito control efforts on mosquito prone areas identified during surveillance activities
      i. During the appropriate season
      ii. On the appropriate habitat and mosquito life stage and species of mosquito

**Public Health Significance**

Public health officials must be vigilant for arboviruses during mosquito season (May 1-November 1) because the mosquito vectors which carry them have been found in West Virginia. The purpose of surveillance is to identify whether human cases are likely so that appropriate prevention measures can be taken. Public health has a major role in prevention and control of arboviruses through surveillance, public and provider education, and through promotion of mosquito control activities.

For these reasons, surveillance is an extremely important function of public health. This season, the public health community is funded to perform mosquito surveillance. Mosquito surveillance is conducted to identify mosquito breeding sites and prioritize sites for abatement. For example, sites breeding the treehole mosquito should be abated or larvacided if they are in close proximity to human populations because the treehole mosquito is the vector for La Crosse encephalitis; whereas sites breeding nuisance mosquitoes are low priority for abatement. Another purpose of mosquito surveillance is to determine if disease-carrying adult mosquitoes are present. Again, this information should be used for mosquito control so that human cases of arboviral infection can be prevented. The West Virginia Department of Health and Human Resources is conducting limited adult and larval mosquito surveillance at this time.

The ecology and public health aspects of arboviruses are complex. The seasonality of arboviral transmission is variable and depends on the geographic location of exposure, the specific cycles of viral transmission, the arbovirus, and local climatic conditions. West
Virginia public health officials are encouraged to take the necessary time to educate themselves about these diseases.

For information on clinical descriptions, etiologic agents, reservoirs, modes of transmission, incubation and Infectious periods, outbreak recognition, case definition (encephalitis or meningitis), and laboratory diagnosis of the following diseases, please see the IDEP webpage (http://www.wvdhhr.org/idep/A-Z/A-Z.asp):

- St. Louis encephalitis/meningitis
- West Nile encephalitis/meningitis
- Eastern equine encephalitis/meningitis
- Western equine encephalitis/meningitis
- La Crosse encephalitis/meningitis

**Preventive Interventions**

Share these prevention messages with the public:

1. Empty standing water in old tires, cemetery urns, buckets, plastic covers, toys, or any other container where mosquitoes may breed.

2. Empty and change the water in bird baths, fountains, wading pools, rain barrels, and potted plant trays at least once a week if not more often.

3. Drain or fill temporary pools with dirt.

4. Keep swimming pools treated and circulating, and rain gutters unclogged.

5. Use mosquito repellents containing DEET, Picaridin or Oil of Lemon Eucalyptus. Apply sparingly to children before they play out of doors, and rinse children off with soap and water when they come back in. Do not apply repellent to the face and hands of young children because they may rub it in their eyes. Follow label directions and precautions closely.

6. Use head nets, long sleeves, and long pants if you venture into areas with high mosquito populations.

7. Make sure window and door screens are “bug tight.”

**Surveillance Indicators**

1. Number of site visits that are conducted within one week of a confirmed case of arboviral disease and in response to complaints, with environmental evaluation (including GIS coordinates of location with reference datum noted), patient and family education, and a follow-up summary of surveillance results.
2. Number of mosquito pools submitted from West Virginia counties to the office of laboratory services

3. Number of mosquito trap nights per season.

4. Number of confirmed cases of arboviral disease.