

Arboviral Investigation Guideline

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Arboviral Disease * – Neuroinvasive and Non-Neuroinvasive Disease Management and Investigative Guidelines * (Encephalitis Agents Only, Including WNV)

CASE DEFINITION (CDC 2004)

A. Clinical Description for Public Health Surveillance:

Clinical criteria for diagnosis are classified either as neuroinvasive or non-neuroinvasive, according to the following criteria.

- Neuroinvasive disease requires the presence of fever and at least one of the following, as documented by a physician and in the absence of a more likely clinical explanation:
 - Acutely altered mental status (e.g., disorientation, obtundation, stupor, or coma), or
 - Other acute signs of central or peripheral neurologic dysfunction (e.g., paresis or paralysis, nerve palsies, sensory deficits, abnormal reflexes, generalized convulsions, or abnormal movements), or
 - Pleocytosis (increased white blood cell concentration in cerebrospinal fluid [CSF]) associated with illness clinically compatible with meningitis (e.g., headache or stiff neck).
- Non-neuroinvasive disease requires, at minimum, the presence of documented fever, as measured by the patient or clinician, the absence of neuroinvasive disease (see description above), and the absence of a more likely clinical explanation for the illness. Involvement of non-neurological organs (e.g., heart, pancreas, liver) should be documented using standard clinical and laboratory criteria.

B. Laboratory Criteria for Case Classification:

- Confirmed:
 - Four-fold or greater change in virus-specific serum antibody titer, or
 - Isolation of virus from or demonstration of specific viral antigen or genomic sequences in tissue, blood, CSF, or other body fluid, or
 - Virus-specific immunoglobulin M (IgM) antibodies demonstrated in CSF by antibody-capture enzyme immunoassay (EIA), or
 - Virus-specific IgM antibodies demonstrated in serum by antibody-capture EIA and confirmed by demonstration of virus-specific serum immunoglobulin G (IgG) antibodies in the same or later specimen by another serologic assay (e.g., neutralization or hemagglutination inhibition).
- Probable:
 - Stable (less than or equal to a two-fold change) but elevated titer of virus-specific serum antibodies, or
 - Virus-specific serum IgM antibodies detected by antibody-capture EIA but with no available results of a confirmatory test for virus-specific serum IgG antibodies in the same or a later specimen.

C. Case Classification:

- Confirmed: A case that meets one or more of the above clinical criteria and one or more of the above confirmed laboratory criteria.
- Probable: A case meets one or more of the above clinical criteria and one or more of the probable laboratory criteria.
- Suspect (Internal KDHE Definition for Data Management):
 - Lab confirmed only with no clinical information; or
 - Clinical information but lab information is absent; or
 - Virus-specific IgG antibodies in serum with no clinical information.

Note: Because closely related arboviruses exhibit serologic cross-reactivity, the positive results of serologic tests using antigens from a single arbovirus can be misleading. It is important to use cross-neutralization tests with an appropriate battery of closely related viruses to pinpoint the infecting virus.

An appropriate battery of tests would include those arboviruses that are known to occur in the area of residence or in the area of travel during the incubation period for the disease. Kansas has seen human cases of WEE, SLE and WNV.

Because dengue fever and West Nile fever can be indistinguishable clinically, a recent travel history with appropriate serologic testing is vital to diagnosis.

In some persons, West Nile virus-specific serum IgM antibody can wane slowly and be detectable for more than one year following infection. The co-existence of West Nile virus-specific IgM antibody and illness may be coincidental and unrelated. The testing of serially collected serum specimens is important.

D. Laboratory Testing:

- Collection: KHEL Serology kit with yellow top blood tubes or any other red topped, clot separator blood tubes.
- Specimen: Blood or serum (3-5 ml) or CSF
- Timing of collection for serology: Acute obtained <30 days after the onset of symptoms; convalescent should be collect 14-21 days (minimum 7 days) after collection of acute sample.
- Remarks: The State Public Health Laboratory does provide serology testing for WNV and SLE. All other arboviral testing is referred to the CDC.
- For additional information and/or questions concerning isolate submission, and laboratory kits call (785) 296-1620 or refer to online guidance at http://www.kdheks.gov/labs/lab_ref_guide.htm

E. Bioterrorism Potential:

- The alphaviruses are considered highly infectious by aerosol, are stable during storage and can be produced in large amounts. Tick-borne encephalitis agents are readily available, can be mass produced, widely distributed and are potentially lethal on a large scale.

F. Outbreak Definition:

- A single case should be actively pursued to determine whether an outbreak is present in the community.

INVESTIGATOR RESPONSIBILITIES

A. Investigation Related Tasks and Activities:

- 1) Confirm diagnosis with appropriate medical provider.
 - Before contacting the patient or family, first determine what information has been released about the patient's diagnosis and identify if the needed epidemiologic data can be found in the clinical record alone.
 - Obtain information that supports clinical findings in the case definition and information on the onset date of the symptoms.
 - Obtain information on any laboratory tests performed and results.
 - Results of WNV, WEE, and SLE serum serology or CSF testing.
 - Results of any viral studies.
 - For suspected or probable cases of neuroinvasive disease,
 - Verify confirmatory tests were ordered or attempt to have serum or CSF samples forwarded to the state lab for testing.
 - Obtain the results of the first spinal tap (CSF) including total WBC with differential, total RBC, and total protein and glucose.
 - For hospitalizations, obtain medical records, including admission notes, progress notes, lab report(s), and discharge summary.
- 2) Conduct case investigation to determine the individual's at-risk activities and potential site of exposure; evaluate the possibility of additional cases.
- 3) Increase surveillance for cases if an outbreak is suspected or anticipated.
- 4) Initiate control and prevention measures to prevent further spread of disease by the arthropod (if necessary).
- 5) Report all cases and information that helps to confirm cases to the KDHE Office of Surveillance and Epidemiology, using established methods.

Note: Prompt investigation of every suspect and probable case is required to accurately classify or confirm all cases occurring in Kansas.

B. Notifications:

- 1) Immediately contact the local Health Officer, the on-call epidemiologist (local) and KDHE (1-877-427-7317) for the following situations:
 - A bioterrorism situation is suspected.
 - A patient provides a history of donating or receiving blood or an organ.
 - A patient dies.
- 2) As appropriate, use the notification letter(s) and the disease fact sheet to notify the case, contacts and other individuals or groups.

EPIDEMIOLOGY

The United States has seen human cases of mosquito-borne Western Equine Encephalitis (WEE), Eastern Equine Encephalitis (EEE), West Nile Virus (WNV), St. Louis Encephalitis (SLE), and California encephalitis (CE), which were mostly LaCrosse (LAC). While WEE, SLE and WNV are widespread; EEE has been seen only in the Eastern Border, Great Lakes and Gulf Coast states. The CE serogroup have been predominately in states east of Kansas with cases also in Oklahoma, Texas, Colorado and California. Another virus,

Powassan, is a minor cause of encephalitis in the northern United States and is transmitted by ticks. Incidence of arboviral disease varies with occurrence and intensity of epidemic transmission; usually 150-3,000 cases/year.

Arboviruses are sustained in the environment by a cycle of transmission among birds and/or mammals through an arthropod vector, usually a mosquito. Humans are infected accidentally and person-to person transmission does not usually occur. Mosquito-borne infections generally occur in the late summer and early fall. The vectors must be present for the transmission to occur.

Approximately 1% of all WNV cases exhibit symptoms consistent with neuroinvasive disease with a mortality rate approaching 5% among those with the symptoms of neurologic disease. This is compared to neurologic sequelae in 30% of EEE cases and 10% of SLE cases with a case fatality rate of 30% in EEE cases and 5% of SLE cases. Risk groups include the elderly for WNV and SLE, children for LAC, and rural residents of the West for WEE. Those living in low income areas with crowded living conditions have been recognized as an at-risk group in past outbreaks of SLE.

DISEASE OVERVIEW

A. Agent:

A specific virus in one of three groups: 1) Alphaviruses including: Western Equine Encephalitis (WEE), Eastern Equine Encephalitis (EEE) and Venezuelan Equine Encephalitis (VEE); 2) Flaviviruses; including: Japanese Encephalitis (JE), West Nile Virus (WNV), St. Louis Encephalitis (SLE) and tick-borne Powassan (POW) and 3) Bunyaviruses including: the LaCrosse (LAC) and California encephalitis (CE) in the California serogroup.

B. Clinical Description:

Arboviral infections are a group of acute inflammatory viral diseases of usually short duration that may involve parts of the brain, spinal cord and meninges. Signs and symptoms of these diseases are similar but vary in severity and rate of progress. Many infections are asymptomatic. Symptoms associated with mild cases often include febrile headache and/or aseptic meningitis. Acute onset, headache, high fever, meningeal signs, stupor, disorientation, coma, tremors, convulsions and spastic paralysis mark severe infections.

C. Reservoirs:

Dependent on specific virus, but includes: amphibians, bats, birds, reptiles, rodents, and others. Birds are the primary reservoir for SLE, WEE and WNV.

D. Mode(s) of Transmission:

Bite of infective arthropod, usually a mosquito. The most common vectors in the United States include:

- WEE - *Culex tarsalis*;
- EEE - Probably *Culiseta melanura* from bird to bird, and *Aedes* and *Coquillettidia* spp. from birds or other animals to humans;
- SLE - *C. tarsalis*, *C. pipiens-quinquefasciatus* and *C. nigripalpus*;
- WNV – *Culex* spp.

E. Incubation Period:

Varies depending on the specific virus type but usually between 1-15 days:

- WEE 5-10 days;
- SLE 4-21 days;
- WNV 3-15 days;
- CE 5-15 days.

F. Period of Communicability:

Not transmittable person-to-person except under rare circumstances such as transplants or transfusions from viremic individuals.

G. Susceptibility and Resistance:

Susceptibility varies by virus type and infection results in lifelong immunity to the specific virus.

H. Treatment:

No specific treatment, supportive care only.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Standard investigation activities include the following:

- 1) Confirmation of diagnosis using case definition.
- 2) Collection of demographic data (birth date, county, sex, race/ethnicity)
- 3) Collection of clinical information and laboratory results.
- 4) Determination of risk factors and transmission settings. (i.e., travel, outdoor activity, use of repellent)

Standard investigation **includes** completion of the General Investigation Form(s) and for WNV cases the WNV Supplemental form:

B. Case Investigation - Identify Potential Source of Infection:

To help identify the source of the infection, the investigator should focus their investigation within the incubation period of the specific infectious agent and on the following potential vectors or indicators of disease transmission:

- Exposure to mosquitoes or other arthropod vectors during the incubation period, include dates and places.
- Investigate increased mortality in animals in the area.
 - Increased mortality of horses in area may indicate the presence of WEE.
 - Increased mortality of crows or other corvid species may indicate WNV.
- Presence of other cases, include names and locations.
- Travel history during the incubation period, including dates and places.
- Occupation and hobbies.
- History of organ transplantation and blood products – receipt or donation.

C. Contact Investigation – Identify Exposed Individuals / Populations:

- These diseases cannot be transmitted from person-to-person, but an individual living in the same household, travel companions, co-workers, and anyone else who might be exposed to mosquitoes is potentially at risk.
- Transfusion associated transmission (TAT) of WNV: Routine screening of blood products by WNV nucleic acid--amplification tests has markedly

reduced the risk of transfusion transmission, but TAT, though rare, can still occur. Prompt reporting of TAT to the state will allow for the investigation and identification of other possible contacts.

- Organ transplantation transmission: Recipients of the organs of a previously unidentified WNV case are at risk of WNV transmission.
- Transmission of WNV transplacentally and/or through breastfeeding has been documented but the risks are still unknown and under investigation.

D. Isolation, Work and Daycare Restrictions

- None.

E. Case Management, Including Follow-up of cases:

- Pregnant WNV cases require follow-up to report birth outcomes.

F. Contact Management, Including Protection of Contacts:

- WNV associated organ recipients have been treated with Omr-IgG-am, an intravenous immunoglobulin product with high-titered neutralizing antibody to WNV available through a Food and Drug Administration (FDA)-approved IND compassionate release protocol.
 - Since no proven effective treatment or prophylaxis for WNV infection exists; a randomized placebo-controlled, double-blind trial of Omr-IgG-am is underway. More information can be obtained at <http://www.clinicaltrials.gov/show/NCT00068055>
 - Information on other randomized placebo-controlled, double-blind trials for WNV infection is also available at <http://www.cdc.gov/ncidod/dvbid/westnile/clinicalTrials.htm>
- To evaluate infants born to mothers infected with WNV, the Interim Guidelines for the Evaluation of Infants Born to Mothers Infected with West Nile Virus During Pregnancy (MMWR, 2004) can be found online at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5307a4.htm>

G. Environmental Measures:

- The most effective method for reducing mosquito populations is to eliminate stagnant water, where the female mosquito lays her eggs, and to target the larval stages. The control of adult mosquitoes is difficult and expensive.
- To control mosquito breeding involve the community in the following:
 - Eliminate standing water: Check for water trapped in plastic covers on boats and swimming pools. Make sure rain gutters are clean and do not hold water. Fill or drain tree holes, stumps and puddles. Irrigate gardens and lawns carefully to prevent water standing for more than a few days.
 - If that is not possible to eliminate a standing water source:
 - Empty buckets, bowls, cans, bottles, used tires, bird baths and other containers preferably every 3 days but at least once a week.
 - Stock garden ponds with mosquito-eating fish, such as minnows and goldfish and/ or aerate ponds and pools. Remove aquatic vegetation around the edges of garden ponds, to allow predatory fish and beneficial predatory insects to reach the mosquito larvae. When

- feasible, raise and lower the water level to allow predatory fish to reach the mosquito larvae.
 - o Selectively use of larvicides, such as Bti, in standing water sources.
- Additional information can be found at: <http://www.entomology.k-state.edu/DesktopDefault.aspx?tabid=714>
- Other mosquito control activities (public removal of mosquito breeding areas, larviciding, or adulticiding) are usually carried out by local governmental agencies. Actions are taken based upon an assessment of human risk and the appropriateness and feasibility of control measures.
 - The county or joint boards of health have the power and authority to examine and order, in writing, the removal of all nuisances and causes of sickness that in their opinion may be injurious to the health of the inhabitants in their jurisdiction (K.S.A. 65-159).
- Entomologic surveys: Inventory and mapping of mosquito populations with monitoring of larval and adult mosquito density provides measurements of vector population overtime to facilitate appropriate and timely responses to mosquito control. Differentiation between nuisance (non-vector) and vector mosquitoes may not always be done, but is important to note when evaluating the risk of human disease.
- Testing of mosquito pools for WNV: Testing of mosquito pools is contracted through the Kansas State University (KSU). Information on positive pools is shared with the county boards of health and is posted on the KSU website. This activity is dependent upon funding availability from the CDC.
- Testing of dead birds for WNV: A three year period of statewide testing of dead birds in Kansas did not provide a correlation between bird and human cases by time and geographical site in a manner that would be useful for surveillance and intervention. Because it is known that WNV does occur in the state, the testing of birds is not publically funded. It can be done for a fee-for-service through the Kansas State University (KSU).
- Testing of other vertebrates for WNV: Offered as a fee-for-service through the Kansas State University (KSU).

H. Education:

- Key messages on personal protection measures against mosquitoes:
 - Use an insect repellent on the skin. Products that contain DEET, Picaridin or oil of lemon eucalyptus are effective in repelling mosquitoes. Follow the label directions for all repellants closely.
 - Wear protective clothing when practical.
 - Limit outdoor activities at dawn and dusk when mosquitoes are most active.
 - Source reduction: Remove standing water – where mosquitoes breed (e.g., clogged gutters, containers, unused tires).
 - Use larvicide with Bti in water that cannot be drained or removed.
 - Change water preferably every 3 days but at least once a week in birdbaths, pet bowl, and wading pools.
 - Mosquito proof your home by repairing screens on windows and doors.

- Public Information campaigns are a key component in the response to a possible arbovirus outbreak (See Managing Special Situations):
 - Remote / probable chance: Educate public risk potential and personal protection which emphasizes residential vector source reduction
 - Probable risk: Expand public information campaign to emphasize use of repellents, personal protection and avoidance of high vector areas and times, especially among the elderly.
 - Moderate risk: Initiate visible activities to increase attention to risks (speakers, social marketing, and community mobilization for source reduction and to reduce risk to elderly (i.e., screen repair)).
 - High risk: Increase visibility of message; include mass media sources and engage key local partners to speak about WNV.
 - Outbreak: Hold regular public information briefings on status of epidemic and continue emphasis on personal protection measures.
- Additional fact sheets specific to WNV can be located the Kansas Department of Health and Environment (KDHE) WNV Web page at: www.kdheks.gov/westnile/.

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:

- Notify KDHE immediately, 1-877-427-7317.
- The probability of a human outbreak of arboviral disease is defined by:
 - None or negligible: Off-season; adult vectors inactive or not present; climate unsuitable.
 - Remote: Spring, summer, or fall; areas anticipating epizootic activity based on previous arboviral activity in the region, but no current surveillance findings indicating epizootic activity in the area.
 - Probable: Summer or fall; areas with limited or sporadic epizootic activity in birds and/or mosquitoes, but no positives prior to August.
 - Moderate: Spring, summer, or fall; areas with initial confirmation of epizootic arboviruses in birds before August; a horse and/or a human case occurring, or sustained arboviral activity in birds or mosquitoes.
 - High: Spring, summer, or fall; areas with an early season positive or epizootic activity measured quantitatively at a level suggesting high risk of human infection (e.g., high dead bird densities in early summer, sustained high mosquito infection rates, multiple positive mosquito species, mammal cases indicating escalating epizootic transmission, or a human case and high levels of epizootic activity)
 - Outbreak in progress: Multiple confirmed cases in humans.
- Surveillance activities for human cases based on outbreak probability:
 - None / Remote: **Maintain passive surveillance which includes the prompt investigation of every suspect / probable case to collect information needed to classify or confirm**; encourage confirmatory testing of any probable or suspect cases, as false positive IgM tests can occur and IgM titers may persist from one season to the next.
 - Probable: Maintain passive surveillance. Contact medical providers

about the need to consider arbovirus testing for and reporting of all suspected cases. (i.e., direct mailings, participating in hospital meetings and grand rounds, and lectures/seminars to local medical groups).

- Moderate: Initiate hospital surveillance for human cases. (i.e., active surveillance for encephalitis or meningoencephalitis admissions)
- High: Intensify and expand active surveillance for human cases.
- Outbreak: Coordinate with the state on the process for updating and maintaining case counts (i.e., updates to official case counts on public websites; what information is needed for a case to be officially counted.) Communicate with state when discrepancies occur (i.e., case location).

B. Natural disasters and encephalitis outbreaks:

- Natural disasters such as floods can create the potential for outbreaks of disease. When a disaster declaration occurs, the Federal Emergency Management Agency will rely on the CDC to evaluate the risk of vector-borne disease. To be reimbursed for vector control measures, a clear risk of vector-borne disease related to the disaster must be present.
- The types of information needed to estimate the risk are a) mosquito population indices, b) virus infection rates in mosquitoes, c) evidence of increased virus transmission in vertebrate amplifying hosts, d) evidence of disease in equines, e) rainfall and temperature data, f) time of year and g) risk to human population.
- If insufficient information is available for a rapid risk assessment, it is necessary to collect at least part of the data before a decision is made.
 - The state of Kansas did request and receive aid from the Emergency Management Assistance Compact (EMAC) for rapid vector (mosquito) surveillance following the 2007 flooding. A team of entomologists identified a significant proportion of nuisance mosquitoes but a low density of WNV vectors in the flooded areas. A clear risk of vector-borne disease related to the flooding was not present.
- Key messages flooding is unlikely to increase risk of vectorborne diseases:
 - Although mosquito populations are likely to increase in the aftermath of flooding, these are primarily nuisance mosquitoes that do not pose a public health threat. Floodwater mosquitoes lay eggs that remain viable for several years in ground depressions. With flooding and the right conditions, the eggs hatch with adult floodwater mosquitoes emerging in as little as 7-10 days.
 - The mosquitoes that carry WNV and other vectorborne diseases breed in stagnant water with high organic content, such as found in flower pots, tires, bird baths, and other containers, as well as in drainage ditches. The heavy rains that cause flooding are likely to flush out the eggs and larvae of these mosquitoes from such environments.
 - Studies of vectorborne disease following major ecologic disasters over the past 30 years, such as flooding and hurricanes, have shown that epidemics of viral encephalitis have rarely, if ever, occurred in the aftermath of such disasters. Although experience with WNV is more limited, flooding does not appear to increase the risk for transmission.

- Guidelines for the Emergency Management of Mosquito-Borne Disease Outbreaks are available from ASTHO at http://www.astho.org/index.php?template=mosquito_control.html

C. Intentional Contamination

A single diagnosed or suspected case of non-indigenous mosquito-borne encephalitis with no travel history should be reported and investigated immediately. If a natural etiology cannot be established by a prompt and vigorous investigation, the situation is considered a bioterrorist act until proven otherwise.

If suspected:

- Notify local law enforcement and state public health officials.
- Implement “Chain of Custody” procedures for all samples collected, as they will be considered evidence in a criminal investigation.
- Work to define population at risk which is essential to guide response activities. Public health authorities will play the lead role in this effort, but must consult with law enforcement, emergency response and other professionals in the process. The definition may have to be re-evaluated and redefined at various steps in the investigation and response.
- Once the mechanism and scope of delivery has been defined, the identification of the symptomatic and asymptomatic exposed individuals can be completed and recommendations for the treatment and/or chemoprophylaxis made.
- Establish and maintain a detailed line listing of all cases and contacts with accurate identifying and locating information.

Safety Considerations:

- By the time the first cases are identified the risk of exposure is dependent on the number of infected mosquitoes remaining at the exposure site. Appropriate protective clothing and repellents should be used.

Vaccination:

- An investigational, live attenuated vaccine is available for VEE but has a high incidence of side effects such as fever, headache and malaise.
- Investigational, inactivated vaccines are available for EEE, WEE and VEE. None is in widespread use because of problems with poor immunogenicity and need for multiple doses.

Treatment:

- No specific therapy. Patients who develop severe illness may require anticonvulsant and supportive care to maintain fluid and electrolyte balance, for ventilation, and to prevent secondary bacterial infections.

Postexposure prophylaxis (PEP):

- No post-exposure prophylaxis is associated with this group of diseases; however, vaccination may be an option for some of the arboviruses.

Environmental decontamination:

- The viruses do not persist in the environment for long periods of time. No

- environmental decontamination necessary.
- A release in areas populated with appropriate animal host (i.e. horses, birds) and/or appropriate arthropod vectors could initiate both an epizootic and epidemic trends.
 - Integrated pest management at the presumed infected site, including insecticide fogging, may be a reasonable approach.

DATA MANAGEMENT AND REPORTING TO THE KDHE

- A.** Organize, collect and report data with the General Investigation Form(s) and, if investigating WNV, the WNV Supplemental Form.
- B.** Report data electronically via KS-EDSS or by fax, include:
- All essential data that was collected during the investigation, especially data that helps to confirm or classify a case.
 - All information collected on the General Investigation and supplemental forms.

Note:

Report California arbovirus, eastern equine arbovirus, Powassan arbovirus, St. Louis arbovirus, and West Nile arbovirus based on specific disease name.

Further describe cases as “neuroinvasive” / “encephalitis/meningitis” or “non-neuroinvasive” based on clinical signs and symptoms.

West Nile neuroinvasive cases exhibiting paralysis can be reported as “WNV, Acute Flaccid paralysis.”

Laboratory reports not supporting neuroinvasive infection (i.e. no CSF findings) are initially reported in the KS-EDSS as “Non-neuroinvasive.” Clinical information collected from the local investigation may result in the changing of the disease event to “neuroinvasive” or “encephalitis/meningitis”.

ADDITIONAL INFORMATION / REFERENCES

- A. **Treatment / Differential Diagnosis:** American Academy of Pediatrics. 2006 Red Book: Report of the Committee on Infectious Disease, 27th Edition. Illinois, Academy of Pediatrics, 2006.
- B. **Epidemiology, Investigation and Control:** Heymann. D., ed., Control of Communicable Diseases Manual, 18th Edition. Washington, DC, American Public Health Association, 2004.
- C. **Case Definitions:** CDC Division of Public Health Surveillance and Informatics, Available at: http://www.cdc.gov/ncphi/diss/nndss/casedef/case_definitions.htm
- D. **Kansas Regulations/Statutes Related to Infectious Disease:** <http://www.kdheks.gov/epi/regulations.htm>
- E. **Epidemic/Epizootic West Nile Virus in the United States: Guidelines for Surveillance, Prevention, and Control (CDC 2003).** Available at: <http://www.cdc.gov/ncidod/dvbid/westnile/resources/wnv-guidelines-aug-2003.pdf>
- F. **Guidelines for Arbovirus Surveillance Programs in the United States (CDC 1993).** Available at: <http://www.cdc.gov/ncidod/dvbid/Arbor/arboguid.pdf>
- G. **KDHE WNV Resource Links:** http://www.kdheks.gov/westnile/links_resources.html
- H. **Kansas State Veterinary Diagnostic Laboratory:** <http://www.vet.ksu.edu/depts/dmp/service/index.htm>
- I. **ASTO Mosquito Control Resources:** http://www.astho.org/index.php?template=mosquito_control.html
- J. **Additional Information (CDC):** <http://www.cdc.gov/health/default.htm>

Kansas Disease Investigation Guidelines

General Investigation Form

Investigation Information		
Case Type: <input type="checkbox"/> Human Case <input type="checkbox"/> Non-human Case	Disease Name: _____	
Classification: <input type="checkbox"/> Suspect <input type="checkbox"/> Probable <input type="checkbox"/> Confirmed	KS-EDSS Investigation ID: _____	
Outbreak: <input type="checkbox"/> Yes <input type="checkbox"/> No	Outbreak Name: _____	Outbreak #: _____
Onset Date: _____	Diagnosis Date: _____	Report Date: _____
Assigned to (Investigator): _____	Patient Died: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	
Patient Information		
Name Type: <input type="checkbox"/> Default/Common <input type="checkbox"/> Legal <input type="checkbox"/> Maiden <input type="checkbox"/> Nickname		
Last: _____	First: _____	Middle: _____
Street: _____	City/State: _____	Zip: _____
Evening Phone #: _____	Daytime Phone #: _____	
Sex: <input type="checkbox"/> Failure to Report <input type="checkbox"/> Female <input type="checkbox"/> Male <input type="checkbox"/> Other <input type="checkbox"/> Transexual <input type="checkbox"/> Unknown		
Race: <input type="checkbox"/> American Indian or Alaska Native <input type="checkbox"/> Asian <input type="checkbox"/> Black or African American <input type="checkbox"/> Native Hawaiian or Other Pacific Islander <input type="checkbox"/> White <input type="checkbox"/> Unknown		
Hispanic / Latino Ethnicity: <input type="checkbox"/> Yes <input type="checkbox"/> No		
Date of Birth: _____	Age: _____	Age Unit: <input type="checkbox"/> Days <input type="checkbox"/> Weeks <input type="checkbox"/> Months <input type="checkbox"/> Years
Parent Information (if under 18)		
Last: _____	First: _____	Middle: _____
Street: _____	City/State: _____	Zip: _____
Evening Phone #: _____	Daytime Phone #: _____	
Work / Occupation or School / Grade		
Worksites / School: _____		
Occupations / Grade: _____		
Travel History		
1st	Destination: _____	Depart Date: _____ Return Date: _____
2nd	Destination: _____	Depart Date: _____ Return Date: _____
3rd	Destination: _____	Depart Date: _____ Return Date: _____
4th	Destination: _____	Depart Date: _____ Return Date: _____

Supplemental Laboratory Report Form

Lab Reports

Laboratory Name: _____

Lab Report Date: _____

Ordering Provider Name: _____

Phone: _____

Facility: _____

Specimen Accession Number: _____

Specimen Collection Date: _____

Organism Name: _____

Organism Species: _____

Organism Serogroup: _____

Organism Serotype: _____

PFGE Results

Pattern 1 KS: _____

Other State: _____

CDC: _____

Pattern 2 KS: _____

Other State: _____

CDC: _____

Pattern 3 KS: _____

Other State: _____

CDC: _____

Additional Results Information

Reported Test Name:

Coded Result:

Text Result:

Numeric Result:

Comments:

Supplemental Contact Form

Contacts

Last: _____ **First:** _____ **Middle:** _____

Street: _____ **City/State:** _____ **Zip:** _____

Evening Phone #: _____ **Daytime Phone #:** _____ **E-mail:** _____

Sex: Failure to Report Female Male Other Transexual Unknown

Race: American Indian or Alaska Native Asian Black or African American Native Hawaiian or Other Pacific Islander White Unknown

Hispanic / Latino Ethnicity: Yes No

Date of Birth: _____ **Age:** _____ **Age Unit:** Days Weeks Months Years

Worksites / School: _____

Occupations / Grade: _____

Exposure Information

Contact Type: Household Sexual Other: _____ **Partner / Cluster Code:** _____

Date of First Exposure: _____ **Date of Last Exposure:** _____ **Frequency:** _____

Nature of Exposure: _____ **Comments:** _____

Testing and Treatment Information

Clinic Code: _____ **Examination Date:** _____

Examination Test: _____ **Examination Result:** _____

Prophylaxis/empiric treatment date: _____ **Drug / Dosage:** _____

Provider (Name / Facility): _____

Disposition and Diagnosis Information

Initiation Date: _____ **Disposition Date:** _____ **Disposition:** _____

Diagnosis: _____ **Referral Type:** Patient Provider **Post-test Counseled :** Yes No

Currently Assigned To: _____ **Follow-up Date:** _____

Risk Factors

Pregnant: Yes No **If Yes, # of Weeks:** _____

Risk factors for complications in contact: None Pregnant Woman HIV Seropositive Unimmunized Index case is a super-spreader

Child younger than 5 Age > 65 Otherwise immunosuppressed (s/p transplant, high dose steroids, etc)

West Nile Virus Supplemental Form

Kansas Department of Health

Epidemiologic Case History

* indicates required fields

Case Type* <i>Human Case Non Human Case</i>	Classification* <i>Confirmed Not a Case Probable Suspect Deleted Unknown</i>
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Supplemental Form Status <i>Not Done Form Complete Form in Progress Form Approved Form Sent to CDC</i>
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Report Date* <small>mm/dd/yyyy</small>
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Patient Demographic Information

* indicates required fields

Last Name*	First Name*	Middle Name	Name Type*	Age
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Age Unit <i>Days Weeks Months Years</i>	Date of Birth <small>mm/dd/yyyy</small>
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Race* <small>(Check all that apply)</small>			
<i>American Indian or Alaska Native</i>	<i>Asian</i>	<i>Black or African American</i>	
<i>Native Hawaiian or Other Pacific Islander</i>	<i>White</i>	<i>Unknown</i>	

Ethnicity* <i>Hispanic or Latino Not Hispanic or Latino Unknown</i>

Sex* <i>Failure to Report Female Male Other Transexual Unknown</i>

Street Address

City	County	State	Zip
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Evening Phone <small>###-###-####</small>	Daytime Phone <small>###-###-####</small>
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Occupation

Person Providing Report

Name of Reporting Facility*

Risk Exposure History cont.

5. Did the patient do any of the following in the 30 days prior to symptom onset:			
Donate blood/blood products <i>Yes No Unknown</i>		If yes, where did donation take place?	
Receive a blood transfusion <i>Yes No Unknown</i>		If yes, where did the transfusion take place?	
Donate any organs <i>Yes No Unknown</i>		If yes, where did donation take place?	
Receive an organ transplant <i>Yes No Unknown</i>		If yes, where did transplant take place?	
6. Did the patient have any symptoms in the 30 days after:			
Blood/products donation? <i>Yes No Unknown</i>	Date of blood donation <small>mm/dd/yyyy</small>	Blood transfusion? <i>Yes No Unknown</i>	Date of blood transfusion <small>mm/dd/yyyy</small>
Organ donation? <i>Yes No Unknown</i>	Date of organ donation <small>mm/dd/yyyy</small>	Organ transplant? <i>Yes No Unknown</i>	Date of organ transplant <small>mm/dd/yyyy</small>
7. (FEMALE PATIENTS ONLY)			
Was the patient pregnant at time of symptom onset? <i>Yes No Unknown N/A</i>		If yes, how many months?	When is the due date? <small>mm/dd/yyyy</small>
Was the patient breast feeding at time of symptom onset? <i>Yes No Unknown N/A</i>		If yes, child's name	DOB <small>mm/dd/yyyy</small>
Healthcare provider			

Date:

Dear Dr. _____

The state and local health department conducts surveillance and investigation of mosquito-borne diseases including Western Equine Encephalitis and West Nile Virus. To date there have been ____ confirmed human cases of _____ in the state.

Human surveillance for arboviral encephalitis is extremely important for prevention and control. Health care providers and laboratories are required to report all suspect and confirmed cases of arthropod borne encephalitis and meningitis to the health department. If you know of a case of arthropod borne viral encephalitis or viral meningitis, please report it to your county health department immediately.

It would be greatly appreciated if you would share this information with your medical staff as well as other pertinent staff, in an effort to provide better health care to the citizens of this state.

Sincerely,

Investigator Name, Title

Phone #

Address Line 1

Address Line 2

City, State Zip Code

Public Health Fact Sheet

Arboviral Encephalitis

What is arboviral encephalitis?

Arboviral encephalitis is an infection of the central nervous system that causes an inflammation of the brain. It is caused by a number of different viruses transmitted by arthropods such as mosquitoes and ticks. These infections usually occur during warm weather months when mosquitoes are active. The number of cases in the United States varies from 150 - 4,000 cases a year.

What are the symptoms?

Most human infections are asymptomatic (e.g., have no symptoms) or result in a nonspecific flu-like syndrome. Onset may be sudden with fever, headache, myalgia, malaise and occasionally prostration. Infection may, however, lead to encephalitis, with a fatal outcome or permanent neurologic impairment.

How is arboviral encephalitis spread?

Infected mosquitoes spread most arboviral infections. Fortunately, only a few types of mosquitoes are capable of transmitting the disease and only a small number of the mosquitoes are actually carrying the virus at any given time. However, very rare routes of infection have become apparent during the West Nile Virus epidemic, including: transmission through transplanted organs, transplacental (mother-to-child) transmission and transmission to laboratory workers. It is important to note that these methods of transmission represent only a very small percentage of the total number of cases.

Who gets arboviral encephalitis?

Anyone can get an arboviral infection and it varies by virus type; however, young children and the elderly are often the most susceptible.

How is it diagnosed?

Demonstrating specific antibodies to the virus or isolating the virus from blood, spinal fluid, or brain tissue makes the diagnosis. Several different laboratory tests may need to be performed to rule out bacterial meningitis and to determine which virus is causing the illness.

How is arboviral encephalitis treated?

There are no specific treatments to cure arboviral infections; therefore, only the symptoms are treated.

This fact sheet is for information only and is not intended for self-diagnosis or as a substitute for consultation. If you have any questions about the disease described above or think that you may have an infection, consult with your healthcare provider. This fact sheet is based on the Centers for Disease Control and Prevention's Disease and Conditions topic fact sheets.

How can you prevent arboviral encephalitis?

Insect repellents should be used when outdoors in mosquito-infested areas. Homes can be screened to prevent entry of mosquitoes. Communities or municipalities where arboviral infection of mosquitoes occurs may need to establish mosquito surveillance or control programs to reduce mosquito populations through applying pesticides and draining swampy areas, and reducing outdoor objects which may collect water such as tires, cans, etc.

Where can I get more information?

- Your Local Health Department
- Kansas Department of Health and Environment, Office of Surveillance and Epidemiology (877) 427-7317
- <http://www.cdc.gov/health/default.htm>
- Your doctor, nurse, or local health center

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