



# PHYSICIANS' BULLETIN

## WEST NILE VIRUS AND OTHER VECTOR-BORNE DISEASES

*Recent record rains may cause an increase in the number of mosquitoes and rodents in San Diego County, potentially resulting in an increase in West Nile Virus (WNV) and other vector-borne diseases. WNV was found in humans, mosquitoes, birds and other animals in California in 2004. Statewide, 830 WNV infections in humans were reported in 2004 and of those, 28 were fatalities. While there have been no positive WNV cases reported so far in 2005 in San Diego County, there were two human cases of WNV documented in 2004. Two horses and 34 wild birds tested positive for the virus last year in the county as well. When seeing patients with neurologic involvement and recent history of exposure to mosquitoes, consider WNV and other important mosquito-borne viral agents of encephalitis in your diagnosis, such as Saint Louis Encephalitis (SLE) and Western Equine Encephalitis (WEE).*

**WEST NILE VIRUS AND OTHER MOSQUITO-BORNE ENCEPHALITIDES.** WNV is a mosquito-borne flavivirus. Mosquitoes become infected when they feed on infected birds. Subsequently, infected mosquitoes can transmit the virus to humans and other animals. The incubation period in humans is usually three days to two weeks. Most people who are infected with WNV will have no symptoms. About 20% of those who become infected will develop a mild febrile illness (West Nile fever), which signs and symptoms include fever, headache, and body aches, occasionally with a skin rash on the trunk of the body and swollen lymph glands. Severe infection (West Nile encephalitis or meningitis) may present with headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis. It is estimated that 1 in 150 persons infected with WNV will develop a more severe form of disease. Mild disease will generally resolve in three to six days. Symptoms of severe disease may last several weeks; in some, neurological effects may be permanent. Residents and visitors in areas where WNV activity has been identified are at risk. Persons older than 50 years are at greater risk of severe disease.

Most people exposed to mosquito-borne encephalitis viruses remain asymptomatic or may present as nonspecific flu-like syndromes. As with WNV, mild cases of SLE and WEE may occur as viral meningitis. Severe infections may include acute onset of headache, high fever, meningeal signs, stupor, disorientation, coma, tremors, occasionally convulsions in infants, coma, and spastic, but rarely flaccid paralysis. Physicians are requested to report all cases of encephalitis, aseptic meningitis, and atypical Guillain-Barre Syndrome to County Public Health Services.

There is currently no specific treatment for WNV, but supportive care is important for severe illness. More severe cases often require hospitalization. While there currently is no vaccine against WNV for humans, several companies are working towards developing a vaccine. The most sensitive screening test for WNV is the IgM-capture enzyme linked immunosorbent assay (ELISA). Testing for West Nile virus is available through the County of San Diego Public Health Laboratory. Because the clinical presentation of WNV infection resembles that of other Central Nervous System diseases, it is important to consider other etiologies as well.

Suspect cases must be reported to the county health department before referring for testing. Testing is recommended on individuals with encephalitis, aseptic meningitis ( $\geq$  18 years old), acute flaccid paralysis / atypical Guillain-Barré / transverse myelitis of unknown etiology, and aseptic meningitis in individuals  $<$  18 years old after negative workup for enteroviruses. Specimens required include Acute Serum:  $\geq$  2cc serum collected  $\leq$  7 days after onset; Cerebral Spinal Fluid: 1-2cc CSF, if lumbar puncture is performed; and if WNV is highly suspected and acute serum is negative a convalescent (2<sup>nd</sup>) Serum:  $\geq$  2cc serum collected 3-5 days after the acute serum. Testing is also recommended on individuals who are seen by a health care provider for a febrile illness compatible with West Nile fever, lasting at least 7 days; a single serum specimen should be collected at the time of visit for WNV IgM testing. Each specimen should be labeled with date of collection, specimen type, and patient name. Specimens should be sent on cold pack by courier to the County of San Diego Public Health Laboratory, 3851 Rosecrans Street, San Diego, California 92110. On weekends, refrigerate specimens and send to the Public Health Laboratory on Monday. Specimens must be accompanied by a completed West Nile Case History Form and Public Health Laboratory Specimen Submission Form (included in this bulletin).

## -LABORATORY-

The County of San Diego Public Health Laboratory (PHL) offers testing for selected vector-borne diseases. For information and specific instructions on collection and submission of appropriate specimens, call the PHL at (619) 692-8500.

*The documented occurrence of certain arthropod and vertebrate borne diseases in San Diego County warrants your consideration of a number of zoonotic illnesses when seeing patients with recent history of exposure to arthropods, rodents and other vertebrates of public health significance, particularly those patients with travel history to endemic areas within and outside the United States. Mosquito-borne encephalitis, malaria, Lyme Disease, Rocky Mountain spotted fever, plague, tularemia, hantavirus, and rabies are highlighted below for your review.*

**RABIES.** This fatal acute viral encephalomyelitis is transmitted through virus-laden saliva of rabid animals. Initial symptoms are nonspecific and include onset of apprehension, headache, fever, malaise and sensory changes. The disease progresses with neurological symptoms, which may include insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, hypersalivation, difficulty swallowing, and hydrophobia. Death usually occurs within days of the onset of symptoms. Human rabies can be prevented by eliminating exposure to rabid animals and administration of appropriate pre-exposure and post-exposure prophylaxis to those at risk. The diagnosis of rabies should be considered seriously in cases of encephalitis where the patient has lived or recently visited in an area where rabies is enzootic, even in the absence of a significant exposure history.

**RABIES PROPHYLAXIS.** Because rabies is almost always fatal, post exposure prophylaxis (PEP) should be administered immediately whenever a patient is bitten, scratched or has other exposure, such as open wound, abrasion or mucous membrane contact with the saliva or nervous system tissue of a high risk animal. PEP should be administered immediately whenever a domesticated animal, such as a dog, cat or ferret, is not available for rabies testing or follow-up observation, regardless of the animal's vaccination status. If the animal is wild (non-domesticated), such as a bat, skunk,

raccoon, fox, coyote, bobcat or other wild mammal, and it is not available for rabies testing, PEP should also be administered immediately. PEP should be seriously considered if a patient was asleep in a room where a bat is found dead or alive, and the animal is not available for rabies testing. PEP is not indicated if a patient is bitten, scratched or otherwise exposed to a low risk animal, such as a mouse, rat, squirrel, guinea pig or hamster. For consultation about human exposure to rabies and animal laboratory testing and quarantines, contact the Community Epidemiology Branch at (619) 515-6620.

**PLAGUE:** Plague, which is caused by *Yersinia pestis*, has been documented in San Diego County in wild animals, primarily ground squirrels. Patients should be asked about possible exposures to fleas and/or their wild animal hosts, particularly in rural and mountainous areas if symptoms are consistent for plague. The most common presentation in humans is lymphadenitis in nodes of the inguinal (90%), axillary or cervical area. The involved nodes are swollen and tender and may suppurate. Fever is often present. All forms of this bubonic plague, including those without lymphadenopathy, may progress to septicemic plague disseminating to various parts of the body. Secondary lung involvement may lead to pneumonia, possibly with mediastinitis or pleural effusion. Plague pneumonia may lead to person-to-person [or animal to person] transmission of respiratory droplets

resulting in primary pneumonic or pharyngeal plague. Laboratories should refer suspected isolates of *Y. pestis* to the PHL for rapid identification or rule out.

**TULAREMIA:** Commonly known as "rabbit fever" and "deer fly fever," this zoonotic disease is caused by the gram-negative coccobacillus *Francisella tularensis*. The clinical presentation varies according to the route of exposure and host response, but characteristically presents as an acute febrile illness. Most often patients present with an ulcer at the site of introduction, accompanied by swelling of regional lymph nodes, pharyngitis, ocular lesions, and pneumonia. Transmission may be through an arthropod bite, including hard (ixodid) ticks, *less frequently by* deer flies, by inoculation with contaminated water, blood or tissue while handling infected animal carcasses particularly those of rabbits, squirrels, voles, mice and rats. Tularemia can also be contracted from contaminated water, or by inhalation of dust from contaminated soil, and rarely from animal bites (including dogs, cats, coyotes, squirrels, skunks and hogs whose mouth contains the pathogen, probably acquired from eating an infected animal). Handling of contaminated animal skins (pelts) has also resulted in transmission of the disease. Laboratories should refer suspected isolates of *F. tularensis* to the PHL for rapid identification or rule out.

**HANTAVIRUS:** Wild rodents are the primary reservoirs for hantavirus. Infected rodents shed virus in their saliva, urine and feces. Infection primarily occurs when dried or fresh materials contaminated by rodent saliva or excreta are disturbed and inhaled as aerosols or are directly introduced into broken skin. Infection has also occurred through the bite of an infected rodent. Initial symptoms are similar to less severe viral infections, with most cases experiencing fever, myalgia and chills. Other symptoms include dyspnea, nonproductive cough, headache, nausea, vomiting, diarrhea and malaise. The illness progresses rapidly to severe respiratory failure and shock. The mortality rate is nearly 40%. Testing for antibody to the viral agent that causes hantavirus pulmonary syndrome (HPS) can be done by the State Viral and Rickettsial Disease Laboratory (VRDL). An acute blood (5-10 ml in a red/gray top tube) and a case report questionnaire should be submitted to the Public Health Laboratory, which will forward the specimen to the State. A convalescent serum should be collected 10 to 14 days after onset as well.

**MALARIA.** Malaria in humans is caused by *Plasmodium falciparum*, *P. vivax*, *P. ovale* and *P. malariae*. Competent anophelene vector mosquitoes are relatively common in San Diego County,

and locally acquired cases of malaria have occurred in this county during the mid to late 1980's. A history of mosquito bites should be reviewed in patients presenting with symptoms compatible with malaria, which include shaking chills, high fever, sweats, and headache. Because of the cyclic nature of this disease, persons with mild symptoms should return when symptoms intensify and the parasite, which is not evident in the blood during mild symptoms, is once again present. If malaria is suspected, a thick and thin smear of peripheral blood should be obtained and examined for the presence of malaria parasites. The blood should be collected prior to therapy. Optimal results are obtained with blood collected during spikes of fever and with smears prepared from freshly collected uncoagulated blood. The smears and the blood (in purple top tubes with EDTA anticoagulant) should be delivered or sent to the PHL.

**LYME DISEASE.** *Borrelia burgdorferi*, the causative spirochete of Lyme Disease, has been found in the Western Black Legged tick, *Ixodes pacificus*, which is fairly common in San Diego County. Locally acquired Lyme Disease cases have also been reported in this county. Initial symptoms of Lyme Disease may include skin lesion/rash, frequently, but not always, annular (erythema migrans -

EM), accompanied by flu-like symptoms, fever and muscle aches. Some individuals exhibit swollen lymph glands. Most persons treated with appropriate antibiotics at this stage will have a quick recovery. Lack of treatment of Lyme Disease may result in long-term complications including disorders of the heart or nervous system, and arthritis. Because serological tests do not detect all infections, patients should be treated based on clinical observations.

**ROCKY MOUNTAIN SPOTTED FEVER.** Rocky Mountain spotted fever, which is caused by *Rickettsia rickettsii*, is characterized by a sudden moderate to high fever, nausea, vomiting, severe headache, muscle pain, joint pain, chills, conjunctival injection, lack of appetite, abdominal pain, diarrhea, and a maculopapular rash (35% to 60% of patients) which appears on the extremities at first, including the palms and soles (50% to 80% of patients with rash), and rapidly spreading to much of the body. RMSF is transmitted by the Rocky Mountain wood tick, *Dermacentor andersoni*, in the western region of the US, and the American dog tick, *D. variabilis*, in the eastern region. Both tick vectors also serve as reservoirs, maintaining the pathogen in nature through transovarial and transtadial transmission.

**-REPORTING REMINDER-**

Health care providers are urged to promptly notify the County Health and Human Services Agency, Community Epidemiology Branch of any reportable communicable and non-communicable disease and condition at:

- (619) 515-6620, M-F 8:00 AM to 5:00 PM
- (858) 565-5255, Evenings & Weekends, FAX (619) 515-6644

The Physicians' Bulletin is published on an as needed basis by the County of San Diego Health and Human Services Agency to provide updated information on health issues of concern to San Diego County's medical community.

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