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CD Connection

Orange County Communicable Disease News

Health Care Agency/Public Health Services - Epidemiology

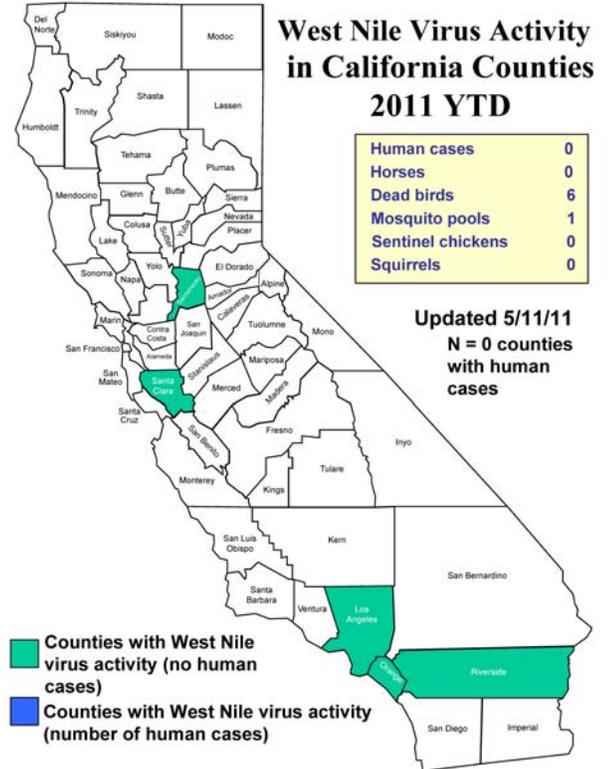
May 11, 2011

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

Orange County reports its first West Nile Virus positive bird of the season! This is the first detection of WNV in Orange County this year. WNV has also been detected in mosquito samples and/or dead birds in four other California counties (Los Angeles, Riverside, Sacramento, and Santa Clara). Although no human cases of WNV infection have been reported yet this season in California, WNV is endemic and we expect to see cases every year. In previous years, the first WNV cases in Orange County usually had symptom onsets starting in mid-June to mid-July.

Consider WNV infection in your patients with aseptic meningitis, encephalitis, acute flaccid paralysis or prolonged fever and submit serum specimens for testing.

- **Diagnosis** is made by serology (IgM or paired acute and convalescent IgG) for WNV. Testing is available through commercial laboratories and through OC Public Health on a case-by-case basis (714-834-8180).
 - WNV IgM may be negative early in the course of the disease and serology may cross react with other flaviviruses (e.g., dengue, St. Louis Encephalitis, or yellow fever, including yellow fever vaccine).
 - Repeat serology may be indicated if initial testing is negative in the first 10 days after onset of symptoms.
- **Treatment** is mainly supportive care. For clinical trials: www.cdc.gov/ncidod/dvbid/westnile/clinicalTrials.htm.
- **For clinical guidance:** <http://www.cdc.gov/ncidod/dvbid/westnile/clinicians/>.
- **Reporting:** WN fever (WNF), West Nile Neuroinvasive Disease (WNND), asymptomatic WNV infection, aseptic meningitis, and encephalitis are all reportable diseases and should be reported within one working day to Public Health via phone (714-834-8180) or fax (714-834-8196).



Educate your patients, friends and family about WNV prevention -- avoiding mosquito bites:

- Eliminate standing water on your property, as this is where mosquitoes breed.
- Make sure that door and window screens are installed and in good condition.
- When outdoors, use an insect repellent containing DEET, picaridin, oil of lemon eucalyptus, or IR3535. (See www.cdc.gov/ncidod/dvbid/westnile/ga/insect_repellent.htm for more info.)
- Avoid being outdoors during dusk and dawn and wear long sleeves and long pants while outdoors.

Recommended Resources

Orange County Health Care Agency:
www.ochealthinfo.com/epi/wnv

Orange County Vector Control District:
www.ocvcd.org or Ph: 714-971-2421

California Department of Public Health:
www.westnile.ca.gov

Centers for Disease Control and Prevention:
www.cdc.gov/ncidod/dvbid/westnile

For comments or suggestions on this newsletter, please contact Sandra Nutter, MPH, or Dr. Michele Cheung at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.

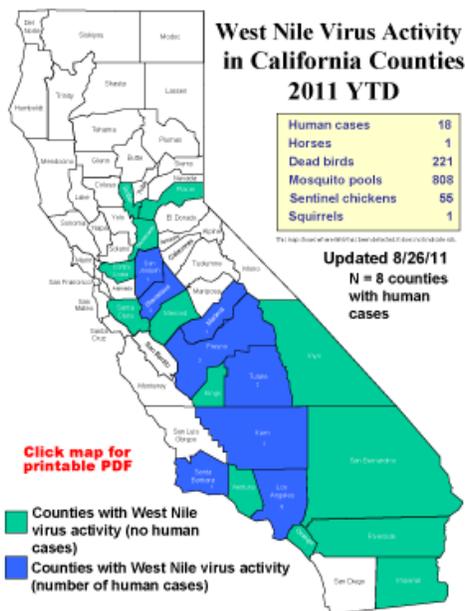
August 26, 2011

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

West Nile Virus (WNV) and Typhus Update

Orange County has reported its first human case of West Nile Virus this year. Consider WNV infection in your patients with aseptic meningitis, encephalitis, or prolonged fever and submit specimens for WNV testing. For more information, see www.ochealthinfo.com/epi/wnv.

- The first human case of WNV this season has been reported in an adult male who experienced onset of symptoms in mid-August and was hospitalized with neuroinvasive disease (WNND).
- Diagnosis is best made by serology (IgM or paired acute and convalescent IgG) for WNV. WNV IgM may be negative early in the course of the disease and may cross react with other flaviviruses. Repeat serology may be indicated if initial testing done in the first 10 days after onset of symptoms is negative.
- WNV infection, aseptic meningitis, and encephalitis are all reportable diseases and should be reported within one working day to OC Epidemiology via phone (714-834-8180) or fax (714-834-8196).



West Nile Virus Update 2011

Orange County:

- One human case of WNND has been reported. Birds and mosquitoes have also tested positive for WNV in Orange County. To report dead birds, call Orange County Vector Control at 714-971-2421 x 117.

California:

- As of August 26, 18 human cases of WNV have been reported from 8 local health jurisdictions: Fresno (3), Kern (1), Los Angeles (6), Madera (1), San Joaquin (1), Santa Barbara (1), Stanislaus (3), and Tulare (2). One additional asymptomatic presumptive viremic blood donor has been reported.

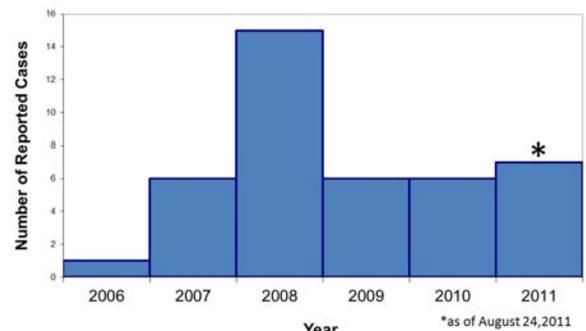
United States:

- As of August 23, 77 human cases of WNV, including 3 deaths have been reported to the CDC. Thirty presumptive viremic blood donors have also been reported. States with highest number of reported cases include Arizona, California, Mississippi, and Florida.

Typhus in Orange County

- Four cases of endemic (flea-borne) typhus have been reported in the past two months. Signs and symptoms of typhus may include fever, headache, myalgia, rash, aseptic meningitis, transaminitis, thrombocytopenia, and/or leukopenia. All rickettsial infections should be reported to OC Epidemiology within 7 calendar days.
- Given the cross-reactivity in serology among rickettsial species, serum should be sent for *R. typhi* and *R. rickettsii* IgM and IgG on suspect cases. Initial testing may be negative early in illness. Whole blood (5 ml in EDTA) for polymerase chain reaction testing on acute suspect cases may be arranged through OC Epidemiology if indicated.
- Empiric therapy with doxycycline should be started in suspect cases pending laboratory confirmation as testing turnaround may take several days and early treatment can prevent severe and fatal infections.
- See www.ochealthinfo.com/epi/typhus for more information.

Endemic Typhus Cases by Year of Report*
Orange County, CA



For comments or suggestions on this newsletter, please contact Sandra Nutter, MPH, or Dr. Michele Cheung at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.



CD Connection

Orange County Communicable Disease News

Health Care Agency/Public Health Services - Epidemiology

October 3, 2011

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

REPORTABLE DISEASES LIST UPDATED!

Orange County Public Health has updated the list of reportable diseases, following recent changes made by the California Department of Public Health (CDPH). Refer to www.ochealthinfo.com/epi/report for the latest list. In addition, CDPH has also updated the separate list of laboratory reportable diseases.

Who needs to report?

- Under Title 17, California Code of Regulations (CCR), §2500, “it shall be the duty of every **health care provider**, knowing of or in attendance on a case or suspected case of any of the diseases or conditions [on the reportable diseases list], to report to the local health officer for the jurisdiction where the patient resides...” A **health care provider** includes any of the following:

physician	surgeon	veterinarian	podiatrist	nurse practitioner
physician assistant	registered nurse	nurse midwife	school nurse	medical examiner
coroner	dentist	infection control practitioner		
- In addition, under Title 17, CCR §2508 “it shall be the duty of anyone in charge of a **public or private school, kindergarten, boarding school, or day nursery** to report at once to the local health officer the presence or suspected presence of any of the communicable diseases.”

What are the significant changes? See www.ochealthinfo.com/epi/report for the whole list.

Additions:

- Cyclosporiasis
- Hepatitis E, acute
- Influenza, novel strains (human)

Deletions* (All outbreaks are still reportable, even if disease not on list):

- Colorado Tick Fever**
- Hepatitis, other, acute
- Influenza, avian (see novel)
- Kawasaki Disease
- Rheumatic Fever
- Water-associated disease (e.g., Swimmer’s Itch)

Additional Changes:

- Influenza deaths, persons under 65 years of age (change from under 18 years of age only)
- Measles (Rubeola), reportable immediately by phone (change from within one (1) working day)
- Pneumococcal disease, invasive, 0-18 years only (change from all ages)
- Streptococcal infections, outbreaks of any type and individual cases in foodhandlers and dairy workers only (change from also including all invasive cases)
- Rickettsial Diseases (non-Rocky Mountain Spotted Fever), including Typhus and Typhus-like illnesses (change from Typhus Fever)
- Toxic Shock Syndrome, presumed Staphylococcal only (previously included Streptococcal Toxic Shock Syndrome* also)

Why report?

- Passive reporting is the basis for communicable disease surveillance in the County.
- Reporting of these diseases and conditions is required by law (Title 17, CCR §2500).
- Failure to comply with required disease reporting may be considered as “unprofessional conduct” and result in a citation and/or fine by the Medical Board of California.

How to report: Consult the reportable diseases list for the timeframe (immediately, within one working day, within seven calendar days), manner (by phone, fax, mail), and contact information for reporting. Reports are made to Epidemiology at 714-834-8180 (phone) or 714-834-8196 (fax). Urgent reports after regular work hours, on weekends, or holidays should be made to the on-call public health official.

* Although these diseases are being deleted from the reportable disease list, any outbreaks would still be reportable.

** Some less commonly reported diseases are no longer listed separately however, they are still reportable as Unusual Diseases (e.g. Colorado Tick Fever, anisakiasis, Guillain Barre syndrome, paragonimiasis, and so on).

For comments or suggestions on the newsletter, contact Dr. Michele Cheung at (714) 834-8180.

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CD Connection

Orange County Communicable Disease News

Health Care Agency/Public Health Services - Epidemiology

December 9, 2011

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180



Summary Report for the 2011 West Nile Virus (WNV) Season

If additional cases are reported from 2011, a revised summary will be posted on our website:

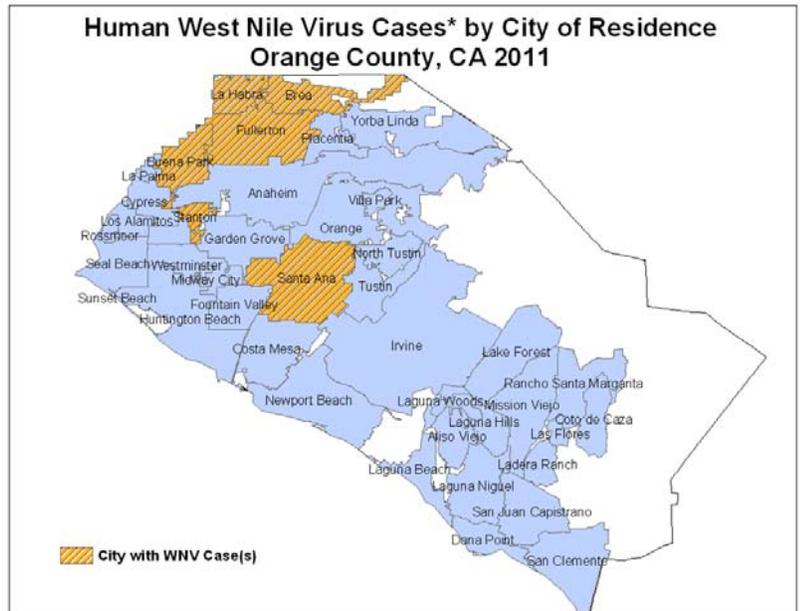
www.ohealthinfo.com/epi/for-phys.htm#Physicians.

Orange County:

- WNV infections:** As of December 8, 2011, 10 WNV cases have been reported in Orange County residents in 2011. All cases (100%) were West Nile neuroinvasive disease (WNND); there were no deaths. The first WNV cases in Orange County were reported in 2004. Since that time, 192 WNV infections, including 7 deaths, have been reported. A total of 180 individuals were classified as symptomatic cases, including 124 (69%) cases with WNND. See the graph below for a comparison of WNV infections by year. *Note: West Nile Fever is usually a self-limited illness and is likely largely underreported. The majority (80%) of WNV infections are asymptomatic.

- Seasonality:** This season, dates of symptom onset for Orange County WNV cases ranged from August 1 to October 15, 2011. In past seasons, human WNV cases have had symptom onset from mid-June to late October. However, positive birds and/or mosquitoes have been detected throughout the year. WNV is endemic in Orange County and human cases are to be expected each year.

- Geographic distribution of WNV cases, 2011:** This season, as in previous seasons, WNV cases were concentrated in Northern Orange County. WNV cases in 2011 resided in the following cities: Brea (1), Buena Park (1), Fullerton (3), La Habra (3), Santa Ana (1), and Stanton (1). See map at right. WNV activity (in birds and mosquitoes) was also focused in Northern Orange County this year but previously has been detected in most areas of Orange County.

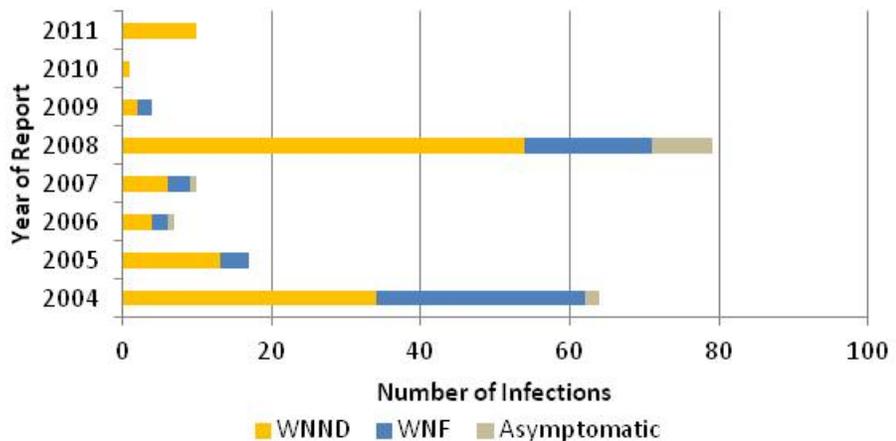


*Note: Location of exposure may differ from the city of residence for WNV cases.

- Demographics for cases, 2011:** The median age for all symptomatic cases reported in 2011 was 65 years (range 30-78 years). Males accounted for the majority (60%) of WNV cases in 2011.

- Clinical outcomes for cases, 2011:** All 10 cases were hospitalized with WNND, with 7 (70%) classified as WN encephalitis and 3 (30%) as WN meningitis. Median length of hospital stay was 11 days (range 3 to 29 days). The majority (70%) of cases were discharged to a skilled nursing facility for further care.

Reported West Nile Virus Infections Orange County, CA 2004-2011



California & United States WNV Activity:

For State updates: www.westnile.ca.gov/.

For CDC updates:

www.cdc.gov/ncidod/dvbid/westnile/

If you have any comments about the flyer, contact Sandra Okubo, MPH or Dr. Michele Cheung at (714) 834-8180.

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CD Connection

Orange County Communicable Disease News

Health Care Agency/Public Health Services - Epidemiology

June 28, 2012

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

West Nile Virus & Typhus Update

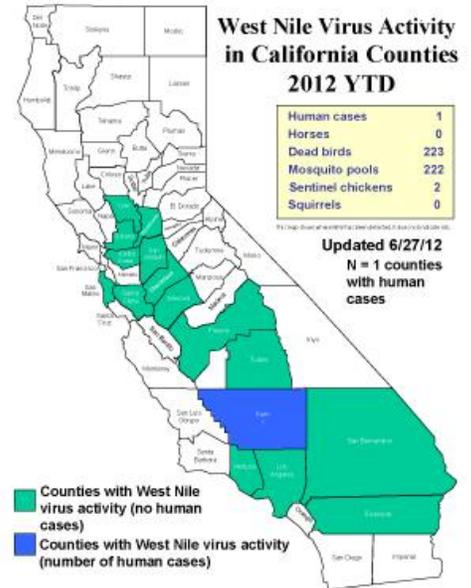
Orange County reports its first West Nile Virus positive mosquito pool of the season! This is the first detection of West Nile Virus (WNV) in Orange County this year. WNV has also been detected in mosquito samples and/or dead birds in 16 other California counties (see map below). Human cases are expected at any time in Orange County and have been reported here each year since 2004. In previous years, the first WNV cases in Orange County usually had symptom onsets starting in mid-June to mid-July.

California reports its first human case of West Nile Virus for 2012.

The patient is an adult from Kern County who developed symptoms in late May. Nationally, two human cases of WNV have been reported so far this year from California and Texas (as of June 19, 2012).

Consider WNV infection in your patients with aseptic meningitis, encephalitis, acute flaccid paralysis or prolonged fever and submit serum specimens for testing.

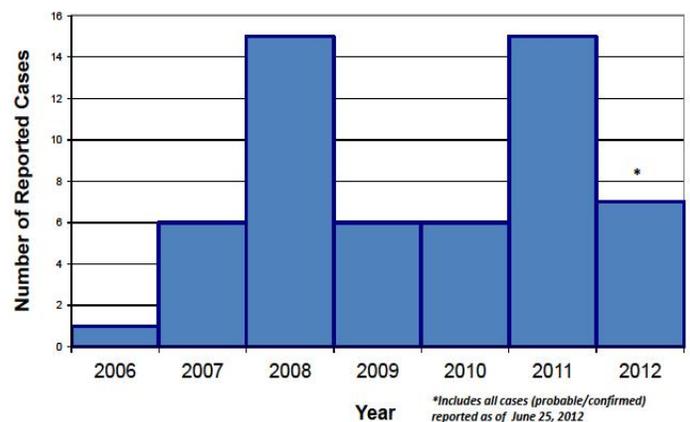
- **Diagnosis** is best made by serology (IgM and IgG, or paired acute and convalescent IgG) for WNV. For West Nile Neuroinvasive Disease cases, CSF IgM is also recommended. Testing is available through commercial laboratories and through OC Public Health on a case-by-case basis.
 - WNV IgM may be negative early in the course of the disease and serology may cross react with other flaviviruses.
 - Repeat serology may be indicated if initial testing is negative in the first 10 days after onset of symptoms.
- **Clinical guidance for WNV:**
<http://www.cdc.gov/ncidod/dvbid/westnile/clinicians/>.



Typhus in Orange County

- Seven cases of endemic (flea-borne) typhus have been reported so far this year.
- Common symptoms of typhus include fever, headache, malaise, and sometimes nausea and vomiting. Rash (macular or maculopapular) is present in about 50% of patients and typically appears on day 4-7 of illness and lasts 4-8 days.
- Diagnosis is mainly through serology (IgM and IgG, or paired acute and convalescent IgG) for *R. typhi*. Testing is available through commercial laboratories.
 - Serology may be negative early in the course of the disease and may cross react with other rickettsial diseases (such as Rocky Mountain Spotted Fever).
 - Repeat serology may be indicated if initial testing is negative early after onset of symptoms.
- Typhus can be fatal if left untreated. Doxycycline is the treatment of choice. Treatment should be based on clinical suspicion and not delayed pending laboratory confirmation.
- See www.ochealthinfo.com/epi/typhus for more information.

Endemic Typhus Cases by Year of Report* Orange County, CA



Disease Reporting: WNV infection, aseptic meningitis, encephalitis and rickettsial diseases, including typhus and typhus-like illnesses, are all reportable conditions. Report suspect/confirmed cases to Orange County Epidemiology (phone: 714-834-8180/fax: 714-834-8196).

For comments or suggestions on this newsletter, please contact Sandra Okubo, MPH, or Dr. Michele Cheung at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.



CD Connection

Orange County Communicable Disease News

Health Care Agency/Public Health Services - Epidemiology

July 18, 2012

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

ATYPICAL HAND, FOOT, AND MOUTH DISEASE (HFMD) – COXSACKIEVIRUS A6 (CVA6)

Atypical HFMD cases associated with CVA6 have been reported in California since late last year and CVA6 has now been detected in Orange County. Increased HFMD activity has also been anecdotally reported.

Background

- HFMD is a common viral illness caused by enteroviruses, predominantly coxsackievirus A16 in the United States and enterovirus 71 in some other areas such as Asia. HFMD mainly affects children aged < 5 years and outbreaks usually occur during the summer and fall months. Most infections with enteroviruses are asymptomatic. HFMD generally presents as a mild febrile illness with rash on the palms of the hands and soles of the feet, skin rash, and/or sores in the mouth. Sometimes nail dystrophies (e.g., Beau's lines or nail shedding) can occur, often weeks after initial symptom onset. Some HFMD patients, such as in outbreaks associated with enterovirus 71 in Asia, have more serious illness and/or complications such as aseptic meningitis or encephalitis. Outbreaks of CVA6 HFMD in children and adults have been described internationally since 2008, but had not been reported in the United States previously.
- **Transmission:** Enteroviruses are spread from person-person by direct contact with nose or throat secretions, vesicle fluid, or stool from an infected person, or from contact with objects or surfaces contaminated by infected persons. **Incubation period** is usually 3-6 days.
- Since November 2011, the Centers for Disease Control and Prevention (CDC) has received reports of atypical HFMD associated with CVA6. Several cases have been confirmed in California and many other states have reported activity as well. No deaths have been reported to date. See the 3/30/2012 edition of *MMWR* at www.cdc.gov/mmwr.

Why is HFMD caused by CVA6 of interest?

Cases of HFMD caused by CVA6 are more likely to have the following when compared to "typical" HFMD:

- More severe fever;
- More extensive rash; may involve entire extremities, face, buttocks, trunk and areas of previous skin disease or damage (e.g., areas of eczema, dermatitis, etc.);
- Larger blisters, sometimes hemorrhagic;
- Onychomadesis (nail shedding) and/or peeling of skin (usually a few weeks after);
- Affects older children, adolescents and adults in addition to young children.

What should you do if you have a case of atypical (severe) HFMD?

- Educate the patient/family about the signs/symptoms and transmission of HFMD. Emphasize handwashing, disinfection of surfaces and fomites, avoidance of sharing personal items, exclusion from child care until afebrile for at least 24 hours without fever-reducing medications AND until lesions are healed or scabbed and no longer draining/oozing.
- **Report the following HFMD cases immediately to Public Health at 714-834-8180:**
 - Severe cases who have been hospitalized;
 - Cases with neurologic symptoms; and
 - Any HFMD outbreaks.

Public Health can arrange for testing on patients meeting the above criteria on a case-by-case basis.

Eye on Influenza: In contrast to previous summers, low levels of influenza A and B activity, including severe cases (ICU or death) in persons < 65 years of age and outbreaks, continue to be reported in Orange County, California, and other areas in the U.S. Sentinel providers and hospital laboratories should continue to submit specimens to Public Health for influenza testing year-round to detect novel viruses or changes in circulating strains.

For comments or suggestions on the newsletter, contact Dr. Michele Cheung at (714) 834-8180.

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August 1, 2012

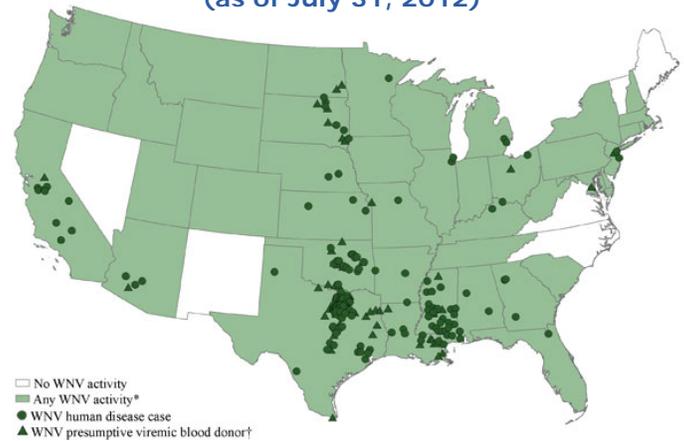
1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

West Nile Virus & Typhus Update

Orange County reports its first West Nile Virus human infection of the season! The report, received from a blood collection agency, was on an adult male who donated blood that tested positive for WNV during routine screening.

- **Consider WNV infection in your patients with aseptic meningitis, encephalitis, or prolonged fever and submit specimens for WNV testing** (serum WNV IgM and IgG; in addition, CSF IgM for West Nile Neuroinvasive Disease cases).
 - Testing is available through commercial laboratories and through OC Public Health on a case-by-case basis.

West Nile virus (WNV) activity reported to ArboNET, by state, United States, 2012 (as of July 31, 2012)



- **Report all cases of West Nile Virus infection to Orange County Public Health by phone (714-834-8180) or fax (714-834-8196) within one working day.** All cases of WNV infection are investigated by Public Health and sites of potential exposure are shared with Orange County Vector Control District (OCVCD) so that they can identify, reduce and/or eliminate potential mosquito breeding sites in areas at increased risk of transmission.

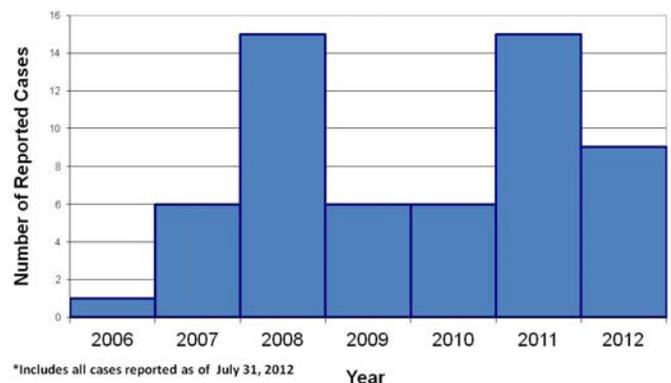
- **Educate your patients, staff, and family about WNV prevention – avoiding mosquito bites!**
 - Eliminate standing water on your property as this is where mosquitoes breed;
 - Make sure that door and window screens are installed and in good condition;
 - When outdoors, use an insect repellent with DEET, picaridin, IR3535 or oil of lemon eucalyptus;
 - Avoid being outdoors during dusk and dawn and wear long pants and long sleeves when outdoors.

WNV -- California & U.S.: In California, there have been nine human WNV cases reported from five counties this season (as of 7/30) and four presumptive viremic blood donors (asymptomatic), not including ours. Compared to 2011 at this same time, there have been more reports to date this year of human cases, positive dead birds, horses, mosquito pools, and sentinel chicken flocks. Nationally, there have been 241 human WNV cases, including four deaths, and 104 presumptive viremic blood donors (asymptomatic) from 24 states (as of 7/31). Ninety-seven (40%) of the symptomatic cases have been WNND.

Typhus in Orange County

- Orange County continues to receive reports of endemic (flea-borne) typhus cases, with a total of nine cases so far this year.
- Consider typhus in patients with unexplained fever, headache, myalgia and rash, especially if they also have leukopenia, thrombocytopenia, and/or transaminitis.
- See www.ochca.com/epi/typhus for more information.

Murine Typhus Cases by Year of Report*
 Orange County, CA - July 2012



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August 27, 2012

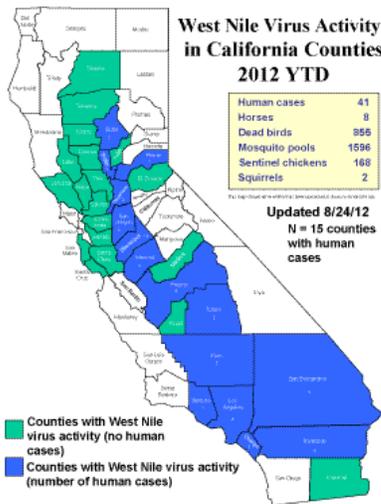
1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

West Nile Virus

Increased West Nile Virus (WNV) activity has been noted in many areas of the U.S. in recent weeks, including Orange County. Consider WNV infection in your patients with aseptic meningitis, encephalitis, or prolonged fever.

- **WNV – Orange County:** So far this season, two cases of WNV and one asymptomatic WNV-positive blood donor have been reported in Orange County. The number of birds and mosquitoes testing positive for WNV has also increased in recent weeks. The peak of WNV season is typically in August and September in Orange County.

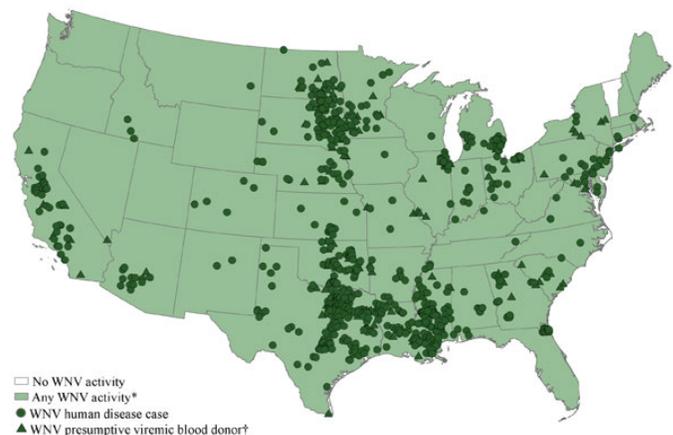
- **Consider WNV in your patients and submit specimens for WNV testing** (serum WNV IgM and IgG; in addition, CSF IgM for West Nile Neuroinvasive Disease cases). Testing is available through commercial laboratories and through OC Public Health on a case-by-case basis. **For clinical management:** <http://www.cdc.gov/ncidod/dvbid/westnile/clinicians/>.
- **Report all cases of West Nile Virus infection to Orange County Public Health** by phone (714-834-8180) or fax (714-834-8196) within one working day.
- **Educate your patients, staff, and family about WNV prevention – avoiding mosquito bites!** Fact sheets are available in  [English](#) (225 KB/2 pages) and  [Spanish](#) (371 KB/2 pages)



- **WNV -- California:** A total of 41 human cases have been reported so far this season from 34 counties, including two deaths. Of the 41 cases, 24 (59%) had neuroinvasive illness. Dates of symptom onset for cases ranged from May 23-August 12, 2012.

- **WNV – United States:** As of August 21, 47 states have reported West Nile virus activity in people, birds, or mosquitoes. A total of 1118 cases of West Nile virus disease in people, including 41 deaths, have been reported to CDC. Total cases reported thus far in 2012 is the highest number of West Nile virus disease cases reported to CDC through the third week in August since West Nile virus was first detected in the United States in 1999. Approximately 75 percent of the cases have been reported from 5 states (Texas, Mississippi, Louisiana, South Dakota, and Oklahoma) and almost half of all cases have been reported from Texas.

West Nile virus (WNV) activity reported to ArboNET, by state, United States, 2012 (as of August 21, 2012)



Reporting dead birds helps us track West Nile virus in the community. To report a dead bird, contact Orange County Vector Control at (714) 971-2421 or (949) 654-2421.

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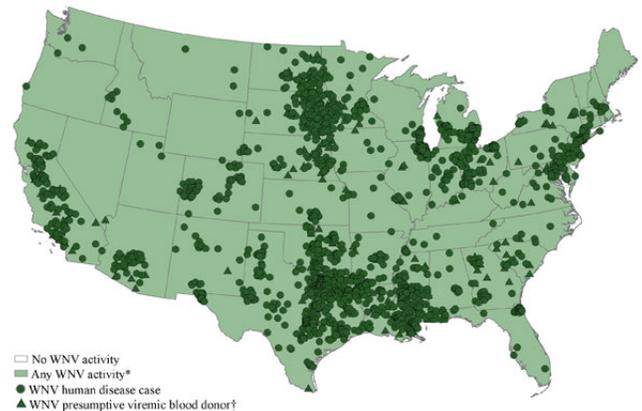
September 14, 2012

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

West Nile Virus

Additional WNV infections have been reported in Orange County. Consider WNV in your patients with aseptic meningitis, encephalitis, or prolonged fever and submit serology for testing.

- **WNV – Orange County:** So far this season, seven human WNV infections, including five symptomatic cases and two asymptomatic WNV-positive blood donors, have been reported. Typically in Orange County, cases of WNV continue to be reported through September and often into October.
- **Clinical Features of WNV Infection:**
 - **~80% of WNV infections are asymptomatic.** Most of these usually do not get diagnosed, but since blood is screened for WNV infection after donation, asymptomatic infections in blood donors are captured. Blood donors who test positive for WNV are followed up for signs/symptoms of infection. In addition, WNV patients are asked about blood donation in the 14 days prior to onset and any positives are reported to the blood collection facility.
 - **West Nile Fever (WNF) – 15-20%:** WNF is a febrile illness accompanied by some combination of headache, fatigue, and myalgias. Skin rash and/or lymphadenopathy also occasionally occur.
 - **West Nile Neuroinvasive Disease (WNND) – <1%:** WNND can manifest as meningitis, encephalitis, and/or acute flaccid paralysis. Meningitis symptoms can include headache, high fever, and neck stiffness. Those with encephalitis can also experience changes in mental status, seizures, or coma. Asymmetric limb weakness or paralysis may occur alone or along with other symptoms.
- **Diagnosis** of WNV infection is best made by serologic testing of WNV IgM and IgG. CSF WNV IgM should be tested in WNND cases. WNV IgM may be negative early in the course of the disease and repeat serologic testing is recommended if WNV infection is suspected.
- **Clinical Management:** Weakness may be a prominent finding in patients with WNV. Evaluate and document motor strength and reflexes in patients with possible WNV infection, especially neuroinvasive disease, and monitor hospitalized WNV patients for respiratory weakness and need for respiratory support. There is currently no specific treatment for WNV infection. More information on clinical management can be found at: <http://www.cdc.gov/ncidod/dvbid/westnile/clinicians/>.
- **Prevention:** Avoiding mosquito bites is the #1 way to prevent WNV infection: (1) use insect repellent effective against mosquitoes causing WNV; (2) stay indoors from dusk to dawn, when these mosquitoes are most active; and (3) wear long sleeves and pants while outdoors. For information about repellent: <http://www.cdc.gov/ncidod/dvbid/westnile/RepellentUpdates.htm>. For information about insect repellent use on children, visit the American Academy of Pediatrics website at: <http://www.healthychildren.org/English/safety-prevention/at-play/Pages/Insect-Repellents.aspx>.
- **WNV -- California:** As of September 12, 2012, a total of 92 human cases have been reported from 35 counties, including four deaths. Of the 92 cases, 58 (63%) had neuroinvasive illness.
- **WNV – United States:** As of September 11, 2012, 2,636 human cases have been reported from 48 states, the highest number of WNV disease cases reported to CDC through the second week in September since 2003. Approximately two-thirds of the cases have been reported from six states (Texas, Louisiana, South Dakota, Mississippi, Michigan, and Oklahoma) and 40 percent of all cases have been reported from Texas.



West Nile virus (WNV) activity reported to ArboNET, by state, United States, 2012 (as of September 11, 2012)

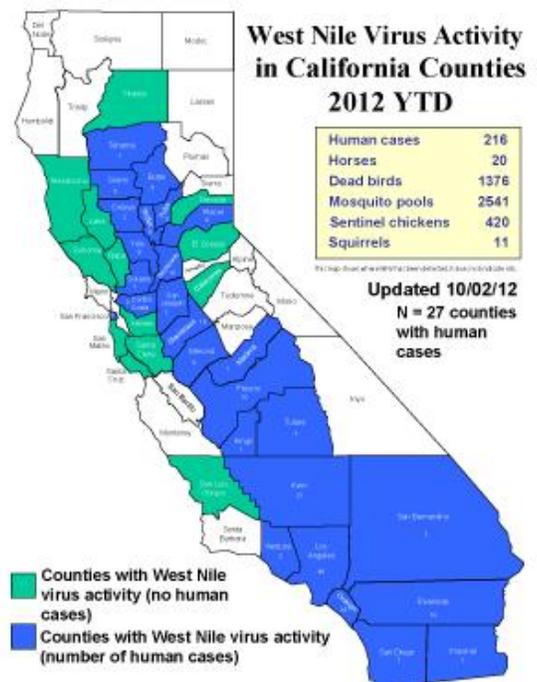
October 4, 2012

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

West Nile Virus

Orange County continues to receive reports of WNV infection. Consider WNV in your patients with aseptic meningitis, encephalitis, or prolonged fever and submit serology for testing.

- **WNV – Orange County:** So far this season, 24 human WNV infections, including 19 symptomatic cases and five asymptomatic WNV-positive blood donors, have been reported. This is the third highest number of infections in one season we have seen in Orange County, surpassed only by 2004 (64 infections) and 2008 (79 infections). Typically in Orange County, cases of WNV continue to be reported through October.
- **Clinical Description:**
 - The incubation period for WNV infection ranges from 2 to 14 days after a bite from an infected mosquito. The incubation period may be longer for immunosuppressed individuals.
 - Clinical syndromes ranging from febrile headache to aseptic meningitis, encephalitis, or acute flaccid paralysis may occur. Rash, myalgia, lymphadenopathy, and weakness may also be prominent.
 - Approximately 80% of individuals who become infected never develop any symptoms. Persons 50 years and older and those with weakened immune systems have the highest risk of severe disease.
- **Diagnosis**
 - WNV diagnosis is best made by serology (WNV IgM and IgG); in addition, CSF IgM for WNNND cases.
 - WNV serology may cross react with other flaviviruses (e.g., dengue, St. Louis Encephalitis, or yellow fever, including yellow fever vaccine). Therefore, a positive WNV IgG with negative IgM may reflect old flavivirus infection and does NOT rule out acute WNV infection.
 - WNV IgM may be negative early in the course of disease. Repeat serology may be indicated if initial testing was done ≤ 7 days after the onset of illness.
- **Clinical Management:** Treatment is mainly supportive care. Information on clinical management can be found at: <http://www.cdc.gov/ncidod/dvbid/westnile/clinicians/>.
- **WNV -- California:** A total of 216 human cases have been reported from 27 counties, including 10 deaths. The largest numbers of cases have been reported from Los Angeles, Kern, Stanislaus and Orange Counties.
- **WNV – United States:** A total of 3,545 human cases have been reported, including 163 deaths. The largest numbers of cases have been reported from Texas (1,438), followed by California (216), Louisiana (213) and Mississippi (202).



Recommended Resources

Orange County Health Care Agency:
www.ochealthinfo.com/epi/wnv

Orange County Vector Control District:
www.ocvcd.org or Ph: 714-971-2421

California Department of Health Services:
www.westnile.ca.gov

Centers for Disease Control and Prevention:
www.cdc.gov/ncidod/dvbid/westnile

For comments or suggestions on this newsletter, please contact Sandra Okubo, MPH, or Dr. Michele Cheung at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.

June 6, 2013

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

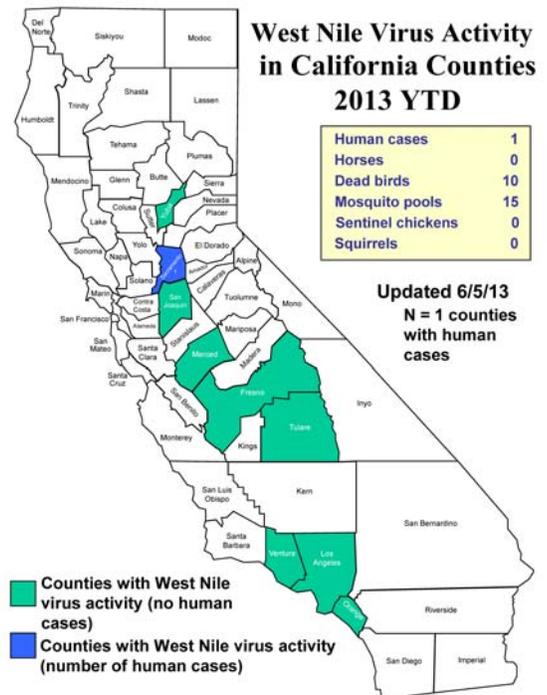
West Nile Virus Season Has Started

Orange County reported its first West Nile Virus positive bird and mosquito pool of the season last week! This is the first detection of West Nile Virus (WNV) in Orange County this year. WNV has also been detected in mosquito samples and/or dead birds in eight other California counties (see map below). Human cases have been reported each year since 2004 in Orange County. In previous years, the first WNV cases in Orange County usually had symptom onsets starting in mid-June to mid-July.

California reported its first human case of West Nile Virus for 2013. One fatal case of human WNV illness has been reported in a Sacramento county male resident who tested positive for WNV earlier this year. His illness, as well as his laboratory test results, is potentially consistent with West Nile neuroinvasive disease.

Consider WNV infection in your patients with aseptic meningitis, encephalitis, acute flaccid paralysis or prolonged fever and submit serum specimens for testing.

- **Diagnosis:** is made by serology (IgM and IgG) for WNV. Testing is available through commercial laboratories and through OC Public Health on a case-by-case basis.
 - WNV IgM may be negative early in the course of the disease and serology may cross react with other flaviviruses
 - Repeat serology may be indicated if initial testing is negative in the first 10 days after onset of symptoms.
- **Clinical guidance for WNV:**
<http://www.cdc.gov/ncidod/dvbid/westnile/clinicians/>
- **Reporting:** West Nile fever (WNF), West Nile Neuroinvasive Disease (WNND), asymptomatic WNV infection, aseptic meningitis, and encephalitis are all reportable diseases and should be reported within one working day to OC Public Health via phone (714-834-8180) or fax (714-834-8196).



Educate your patients, friends and family about WNV prevention -- avoiding mosquito bites:

- Eliminate standing water on your property as this is where mosquitoes breed. Drain pots, unclog gutters, and keep swimming pools clean and chlorinated or drained and covered.
- Make sure that door and window screens are in good condition to keep the mosquitoes out.
- When outdoors, use an insect repellent containing DEET, oil of lemon eucalyptus, picaridin, or IR3535. Always follow the product directions on the label. For more information on use and effectiveness of insect repellent, see EPA flyer
http://www.cdc.gov/ncidod/dvbid/westnile/resources/08_118867_repellent_timeline_8%205X11.pdf OR interactive website:
<http://cfpub.epa.gov/oppref/insect/>

Recommended Resources

Orange County Health Care Agency:
<http://ochealthinfo.com/phs/about/dcepi/epi/disease/wn>

Orange County Vector Control District:
www.ocvcd.org or Ph: 714-971-2421

California Department of Health Services:
www.westnile.ca.gov

Centers for Disease Control and Prevention:
www.cdc.gov/ncidod/dvbid/westnile

For comments or suggestions on this newsletter, please contact Sandra Okubo, MPH, or Dr. Michele Cheung at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.

August 6, 2013

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

West Nile Virus Season is here –

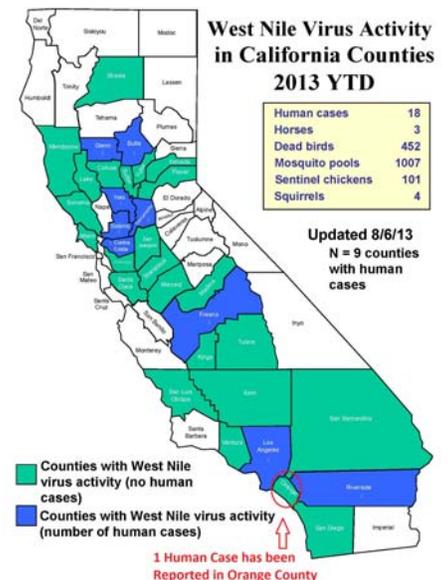
Consider WNV infection in your patients with aseptic meningitis, encephalitis, acute flaccid paralysis or prolonged fever

Orange County reports its first human West Nile Virus case! A woman in her 60's was hospitalized with West Nile Neuroinvasive disease and has since been discharged home. Her symptom onset was in mid-July. This is the first human case in Orange County this year. WNV activity is expected to increase over the next couple of months. Typically, the highest number of cases are seen in August and September.

West Nile Virus Update: In addition to the one case in Orange County, California has reported 18 WNV cases from 9 counties, including two deaths. This is the same number of cases reported at this time last year.

Clinical Information

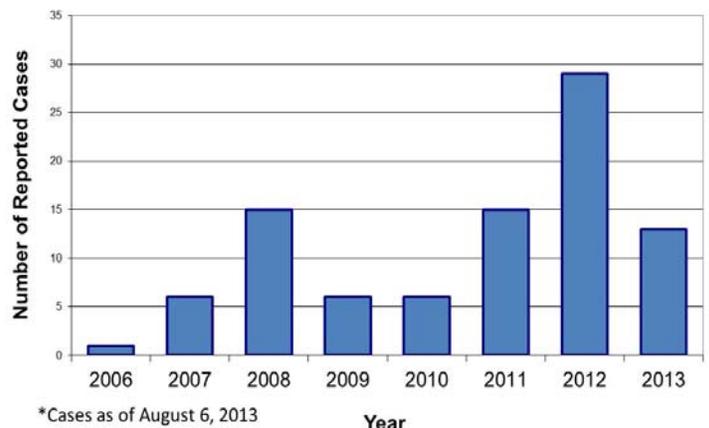
- **Clinical Features of WNV Disease:** ~ 80% of WNV infections are asymptomatic. For symptomatic patients, illness onset begins 2 to 14 days after a bite from an infected mosquito.
 - **WN-Fever:** Febrile illness accompanied by headache, fatigue, myalgias, skin rash, and/or lymphadenopathy.
 - **WN – Neuroinvasive Disease:** Includes meningitis, encephalitis, and acute flaccid paralysis. Symptoms include headache, high fever, and neck stiffness. Additional symptoms may consist of changes in mental status, seizures, or coma. Asymmetric limb weakness or paralysis may occur alone or along with other symptoms.
- **Diagnosis** is made by serology (IgM and IgG) for WNV.
 - WNV IgM may be negative early in the course of the disease (first 10 days after onset of symptoms) and serology may cross react with other flaviviruses, such as dengue.
- **Clinical guidance:** <http://www.cdc.gov/ncidod/dvbid/westnile/clinicians/>



Recent Typhus Cases in Orange County

- Transmission increases during the spring and summer months when fleas are most active. So far this year, 13 cases of endemic (flea-borne) typhus have been reported in Orange County. Last year, 29 cases were reported, the highest number in one year since 2006.
- Diagnosis is made by serology (IgM and IgG, or paired acute/convalescent IgG) for *R. typhi*, which may be negative early in the course of disease and may cross react with other rickettsial diseases. Whole blood for polymerase chain reaction (PCR) testing can be arranged through Public Health if early in illness; please call 714-834-8180.
- Typhus can be fatal if left untreated. Treatment should not be delayed pending laboratory confirmation.

Endemic Typhus Cases by Year of Report
 Orange County, CA (2006-2013*)



For comments or suggestions on this newsletter, please contact Sandra Okubo, MPH, or Dr. Michele Cheung at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.

November 5, 2013

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

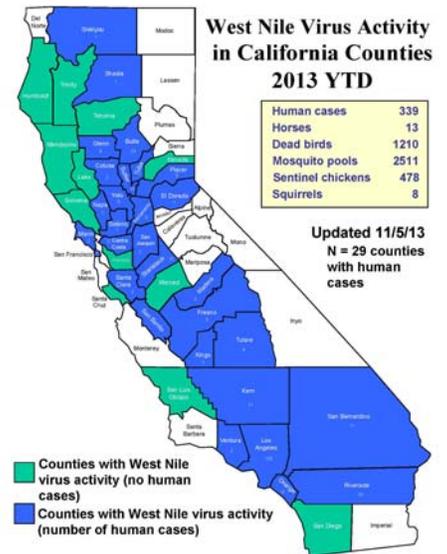
Cases of West Nile Virus (WNV) continue to be reported throughout California. Please remain vigilant for signs of WNV infection in your patients.

Orange County continues to receive reports of West Nile Virus! Nine WNV infections (7 symptomatic cases and 2 asymptomatic blood donors) have been reported so far this season. Of these, three have been reported in the previous two weeks. Last year was a late WNV season in Orange County, with cases reported in November and December. Continue to consider WNV in patients with aseptic meningitis, encephalitis, acute flaccid paralysis, or prolonged fever (>7days).

West Nile Virus in California and U.S.: In California, 339 cases of WNV, including 11 WNV-related fatalities, have been reported so far this season; 20 of these cases were reported during the previous week. Nationally, there have been 2,059 cases reported, including 83 deaths (as of 10/29).

Clinical Information:

- **Clinical Evaluation:** 80% of those infected will be asymptomatic. Most of those with symptoms will develop a febrile illness, with headache, myalgias, and arthralgia also commonly present. Fewer than 1% will develop neuroinvasive disease, with meningitis, encephalitis, or acute flaccid paralysis being most common. Routine clinical laboratory studies are generally nonspecific. In patients with neuroinvasive disease, CSF examination generally shows lymphocytic pleocytosis, but neutrophils may predominate early in the course of illness.
- **Diagnosis:** Serum IgM and IgG for WNV; in addition, CSF IgM for West Nile Neuroinvasive Disease cases.
- **Clinical Management:** Treatment of most cases of WNV infection is supportive care:
<http://pier.acponline.org/physicians/public/d951/d951.html>.

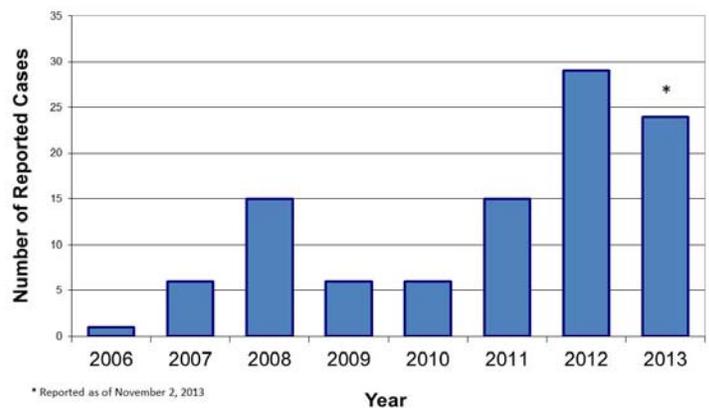


Reporting dead birds helps us track West Nile Virus in the community. To report a dead bird, contact Orange County Vector Control at (714) 971-2421 or (949) 654-2421.

Typhus Update: Orange County

- So far this year, 24 cases of endemic (flea-borne) typhus have been reported in Orange County. Last year, 29 cases were reported, the highest number in one year since 2006 (see chart).
- Common symptoms include fever, which is almost always present and can be accompanied by headache and myalgia. About half of people who are infected develop a rash. Nausea and vomiting may also be present.
- The average incubation period is 12 days after a bite from an infected flea.
- Diagnosis is made by serology (IgM and IgG, or paired acute/convalescent IgG) for *R. typhi*.

**Endemic Typhus Cases by Year of Report
 Orange County, CA**



August 1, 2014

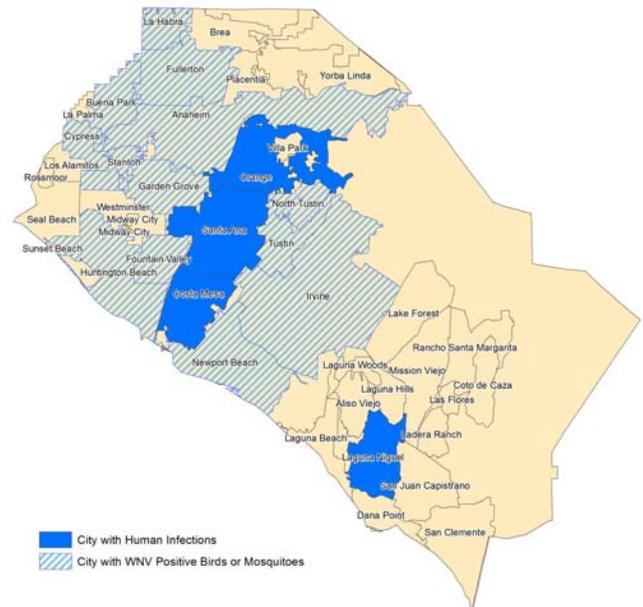
1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

West Nile Virus Update

West Nile Virus (WNV) activity is increasing in Orange County! In the previous two weeks, 6 human cases and one asymptomatic blood donor have been reported in Orange County, for a total of 8 locally acquired infections (1 additional case was travel-related) to date this season. Cities with locally acquired infections include Costa Mesa (1), Laguna Niguel (1), Orange (1), and Santa Ana (5). Additional cities in Orange County have seen WNV activity in birds and mosquitoes. See map at right.

- Orange County Health Care Agency works with Orange County Vector Control District to investigate all WNV cases, provide education and institute control measures to prevent further cases. How can you help?
 - Test suspect human cases for WNV
 - Report suspect/confirmed human cases to Orange County Epidemiology (phone: 714-834-8180/fax: 714-834-8186)
 - Report dead birds to the Orange County Vector Control District: Phone: (714) 971-2421 or (949) 654-2421

West Nile Virus Activity
 Orange County 2014 (as of July 31)



Source: Orange County Health Care Agency, Epidemiology & Assessment
 Orange County Vector Control District
 Note: Human infections are mapped by city of residence and may not indicate the location of exposure

August and September are the busiest months for WNV activity. Consider WNV infection in your patients with aseptic meningitis, encephalitis, acute flaccid paralysis or prolonged fever and submit serum specimens for testing.

- **Diagnosis** is made by serology (IgM or paired acute and convalescent IgG) for WNV. Testing is available through commercial laboratories and through OC Public Health on a case-by-case basis. Repeat serology may be indicated if initial testing is negative in the first 10 days after onset of symptoms.
- **Clinical guidance for WNV:** <http://www.cdc.gov/ncidod/dvbid/westnile/clinicians/>

Educate your patients, friends and family about WNV prevention -- avoiding mosquito bites:

- Eliminate standing water on your property as this is where mosquitoes breed. Drain pots, unclog gutters, and keep swimming pools clean and chlorinated or drained and covered.
- Make sure that door and window screens are in good condition to keep the mosquitoes out.
- When outdoors, use an insect repellent containing DEET, oil of lemon eucalyptus, picaridin, or IR3535. For more information on use and effectiveness of insect repellent: <http://cfpub.epa.gov/oppref/insect/>.

Typhus Update

- Seven cases of endemic (flea-borne) typhus have been reported so far this year.
- Common symptoms of typhus include fever, headache, malaise, and sometimes nausea and vomiting. Rash (macular or maculopapular) is present in about 50% of patients.
- Suspect, probable and confirmed cases should be reported to OC Epidemiology, call 714-834-8180.
- See <http://ohealthinfo.com/phs/about/dcepi/epi/disease/typhus> for more information.

For comments or suggestions on this newsletter, please contact Sandra Okubo, MPH or Matt Zahn, MD at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.



August 18, 2014

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

Update on California's Pertussis Epidemic

Pertussis activity continues at epidemic levels in Orange County and statewide. As of 8/16/2014, 250 pertussis cases have been reported in Orange County, compared with 43 cases at this time last year. Pertussis peaks in incidence every 3-5 years as the number of susceptible people in the population increases; the last epidemic in California was in 2010.

Infants <12 months of age are at highest risk for severe infection and death. To protect this vulnerable population the following is recommended:

- Immunize pregnant women with Tdap during every pregnancy at 27-36 weeks gestation. This dose protects mom and provides the infant with high levels of protective transplacental antibodies.
- Encourage close contacts of infants to be up-to-date with their pertussis vaccine (cocooning).
- Vaccinate infants and children with DTaP followed by Tdap according to the childhood immunization schedule: <http://www.cdc.gov/vaccines/vpd-vac/pertussis/recs-summary.htm>

Diagnostic Testing: Suspect pertussis cases should be tested by nasopharyngeal PCR. PCR is most sensitive within 3 weeks of the onset of the cough (up to 6 weeks for infants). Consider obtaining a CBC: a WBC count that is $\geq 20,000/\text{mm}^3$ with $\geq 10,000$ lymphocytes/ mm^3 in a young infant with a cough illness is strongly suggestive of pertussis infection.

Management of Cases:

- **Treatment:** Antimicrobial treatment should begin as soon as possible after diagnosis, particularly in infants. Treatment may lessen symptoms if begun early during illness and will shorten the period of infectivity.
- **Prophylaxis:** The CDC and AAP recommend post-exposure prophylaxis for all close contacts of a pertussis case. However, during widespread community outbreaks, OCHCA will focus its efforts on postexposure prophylaxis for high-risk contacts, including infants <1 year of age, pregnant women, and their contacts.
 - Recommended Antimicrobial Agents for the Treatment and Postexposure Prophylaxis of Pertussis: <http://www.cdc.gov/mmwr/PDF/rr/rr5414.pdf>
- **Infection control:** Health care workers should use standard and droplet precautions, including a surgical or procedure mask and eye protection when evaluating suspect pertussis patients. Droplet precautions should be maintained until 5 days after the patient is placed on effective therapy, or if no treatment until 21 days after cough onset.
- **Management of cases in school settings:** Cases should be excluded from childcare settings until completion of 5 days of antibiotic treatment, from K-12 grade schools until completion of 3 days of antibiotics, and for 21 days if no antibiotic treatment.

Resources: General pertussis info for clinicians: <http://www.cdc.gov/pertussis/>

Tdap for pregnant women: <http://www.cdc.gov/vaccines/vpd-vac/pertussis/tdap-pregnancy-hcp.htm>

For comments or suggestions on this newsletter, please contact Sandra Okubo, MPH or Matt Zahn, MD at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.

When to Consider Pertussis

Infants < 12 months are at highest risk of severe disease.

- Pertussis should be considered in any infant with persistent or paroxysmal cough.
- In infants cough may be minimal or absent, and apnea may be the only symptom.

For children ≥ 12 months & adults, consider pertussis with:

- Cough > 7 days in persons with no or low-grade fever and any of the following: cough paroxysms, post-tussive vomiting, or inspiratory whoop
- Cough > 14 days with no or low-grade fever and no alternative diagnosis
- Suspicious cough of any duration with no alternative diagnosis and any of the following:
 - Close contact with a pertussis case
 - Patient is a pregnant woman in the 3rd trimester
 - Patient is a close contact of an infant or pregnant woman

Pertussis is a reportable disease. Call OCHCA at 714-834-8180 or fax 714-834-8196 to report a case.



CD Connection

Orange County Communicable Disease News

Health Care Agency/Public Health Services - Epidemiology

September 8, 2014

West Nile Virus Update

Orange County has had a record West Nile Virus season in 2014. Consider WNV infection in your patients with aseptic meningitis, encephalitis, acute flaccid paralysis, or prolonged fever.

In Orange County: A total of 94 human infections have been reported in Orange County this season. The County's previous high for a season was 79 cases in 2008. Santa Ana has had the highest number of infections of any city, but cases are now being reported throughout the county.

Orange County Infections by Type (as of 09/6/14)

West Nile Neuroinvasive	63
West Nile Fever	21
Asymptomatic	9
Classification Pending	1

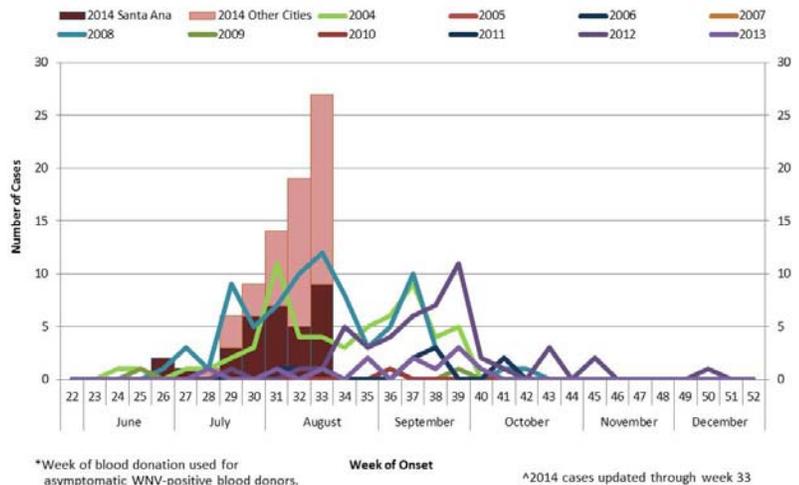
Total Infections	94
Total Deaths	3

In California and the US: The proportion of mosquitoes infected with West Nile Virus is at the highest level ever detected in California. As of 9/5, 207 infections have been reported in California, with 52 reported last week.

Clinical Description:

- The incubation period for WNV infection ranges from 2 to 14 days after a bite from an infected mosquito, and may be longer in immunosuppressed individuals. Almost half of reported WNV cases do not recall mosquito bites.
- Clinical syndromes range from febrile headache to aseptic meningitis, encephalitis or acute flaccid paralysis. Rash, myalgia, lymphadenopathy, and weakness may also be prominent.
- Approximately 80% of individuals who become infected never develop any symptoms. Persons 50 years and older and those with weakened immune systems have the highest risk of severe disease.

Human West Nile Virus Infections, Orange County
Week of Symptom Onset*, 2004 to 2014^



*Week of blood donation used for asymptomatic WNV-positive blood donors.

^2014 cases updated through week 33

Testing for West Nile Virus:

Diagnosis is made by serology (IgM or paired acute and convalescent IgG) for WNV. Testing is available through commercial laboratories and through OC Public Health on a case-by-case basis. Repeat serology may be indicated if initial testing is negative in the first 10 days after onset of symptoms. Clinical guidance for WNV can be found at: <http://www.cdc.gov/westnile/healthCareProviders/>.

Clinical Management:

Treatment is mainly supportive care. Information on clinical management can be found at: <http://www.cdc.gov/westnile/healthCareProviders/>.

Prevention:

Avoiding mosquito bites is the best way to prevent WNV infection. For more on how to protect you and your family, including a list of effective mosquito repellents, see: <http://www.cdc.gov/westnile/prevention/index.html>.

Disease Reporting: WNV infection, aseptic meningitis, encephalitis, are all reportable conditions. Report suspect/confirmed cases to Orange County Epidemiology (phone: 714-834-8180/fax: 714-834-8196).

For comments or suggestions on this newsletter, please contact Sandra Okubo, MPH or Matt Zahn, MD at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.

September 26, 2014



West Nile Virus (WNV) Update

Orange County continues to see increased WNV activity. Consider WNV infection in your patients with aseptic meningitis, encephalitis, acute flaccid paralysis, or prolonged fever.

In Orange County: A total of 159 human infections, including four deaths have been reported in Orange County so far this season. The County's previous high for a season was 79 cases in 2008. Santa Ana continues to report the highest number of infections, but cases have been reported throughout the county (see graph at bottom).

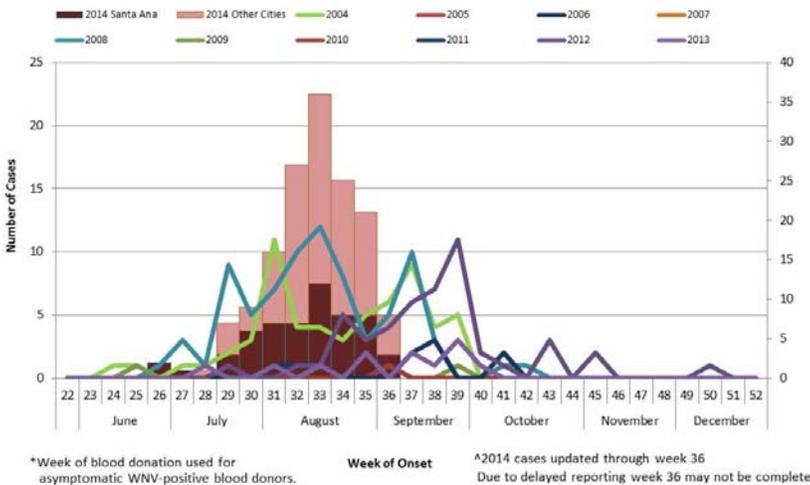
Orange County Infections by Type (as of 09/23/14)	
West Nile Neuroinvasive	109
West Nile Fever	39
Asymptomatic	11
Classification Pending	0
Total Infections	159
Total Deaths	4

In California and the US: So far, a total of 375 human cases have been reported in California. This compares to 176 case reports at this time last year. Most states have human cases. Nationally, 979 cases from 40 states and the District of Columbia have been reported, including 34 deaths.

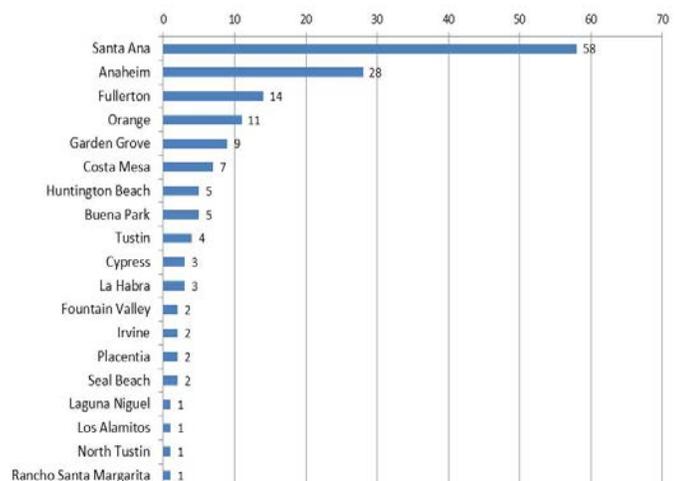
Testing for West Nile Virus:

Diagnosis is made by serology (IgM or paired acute and convalescent IgG) for WNV. Testing is available through commercial laboratories and through OC Public Health on a case-by-case basis. Repeat serology may be indicated if initial testing is negative in the first 10 days after symptom onset.

Human West Nile Virus Infections, Orange County
Week of Symptom Onset*, 2004 to 2014[^]



Number of Reported WNV Infections by City of Residence, Orange County 2014*



*Updated through 9/23/2014. Note: Cases are displayed by city of residence and may not indicate the location of exposure.

Clinical Management:

Treatment is mainly supportive care. Information on clinical management can be found at:

<http://www.cdc.gov/westnile/healthCareProviders/>.

Prevention:

Avoiding mosquito bites is the best way to prevent WNV infection. For information on how to protect you and your family, including a list of effective mosquito repellents, visit:

<http://www.cdc.gov/westnile/prevention/index.html>

Educate your patients, staff, and family about WNV prevention. For brochures and educational information, visit: <http://westnile.ca.gov/resources.php>.

For comments or suggestions on this newsletter, please contact Sandra Okubo, MPH or Matt Zahn, MD at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.

January 2, 2015 (corrected 4/23/15)

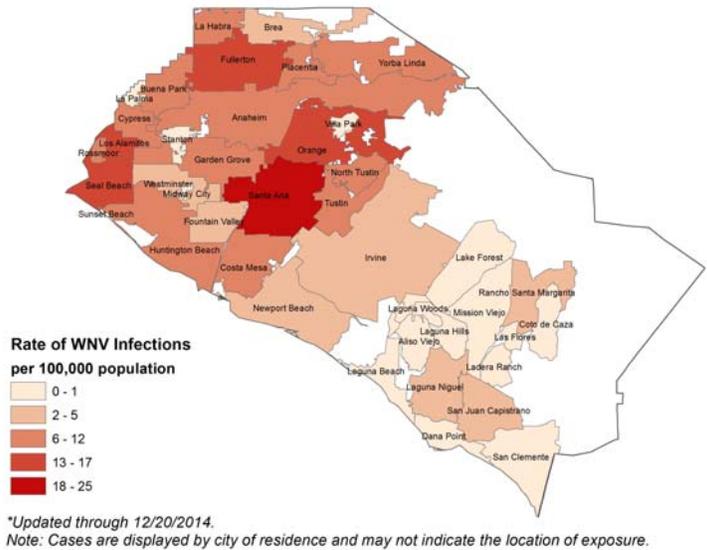
1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

Summary Report for the 2014 West Nile Virus Season - Correction

Orange County had one of the highest rates of West Nile Virus (WNV) human disease in the country in 2014. A total of 264 symptomatic cases and 16 asymptomatic blood donors were reported. This compares to 2,085 total WNV cases reported nationally as of December 16. Symptom onsets for cases ranged from March to November (see timeline below). Seasonal activity increased in late July, peaked in mid-August and began to slow in October.

- Clinical presentation:** Of the 264 symptomatic WNV infections, 198 were WN Neuroinvasive disease (WNND) and 66 were West Nile Fever. *Note: West Nile Fever is usually a self-limited illness and is under-recognized and underreported. The majority (80%) of WNV infections are asymptomatic.
- Clinical outcomes:** The median length of stay for hospitalized patients (n=201) was 5 days (range: 1 to 36 days). 54 were admitted to an intensive care unit and 18 patients were discharged to a skilled nursing facility or rehabilitation center for further care. 8 fatalities occurred this year in persons with an age range of 58-90 years.
- Geographic distribution:** Human infections were reported from 31 cities. Santa Ana had the most reports, particularly early in the season. Though as the season progressed activity spread throughout the county, including in South Orange County. The largest concentration of human infections was in Northern Orange County, consistent with previous years. The county's rate of human infections was 9.30 per 100,000 persons, with the highest rates seen in Santa Ana (24.96), Los Alamitos (17.47), Seal Beach (16.55), Fullerton (14.80) and Orange (13.93) - see map above.

Rate of Human West Nile Virus Infection by City Orange County, 2014*



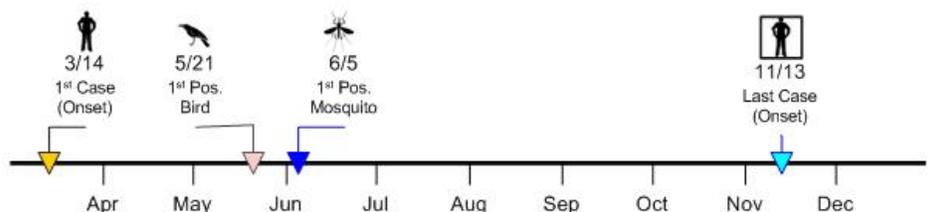
WNV in Orange County – Year Comparison: WNV cases have been reported in Orange County each year since it was first detected in the County in 2004. This year, the number of human infections (280) was higher than all other years combined. A total of 252 human infections, including nine deaths, were reported in Orange County from 2004 to 2013, with a range of 1 in 2010 to 79 in 2008. This season the symptom onset for the first human case was in mid-March. In past seasons, human WNV cases have had symptom onsets from mid-June to mid-December. However, positive birds and/or mosquitoes have been detected throughout the year. WNV is endemic in Orange County and human cases are expected every year.

For More Information:

California update:
www.westnile.ca.gov/.

National update: www.cdc.gov/ncidod/dvbid/westnile/index.htm

West Nile Virus Timeline – Orange County, 2014



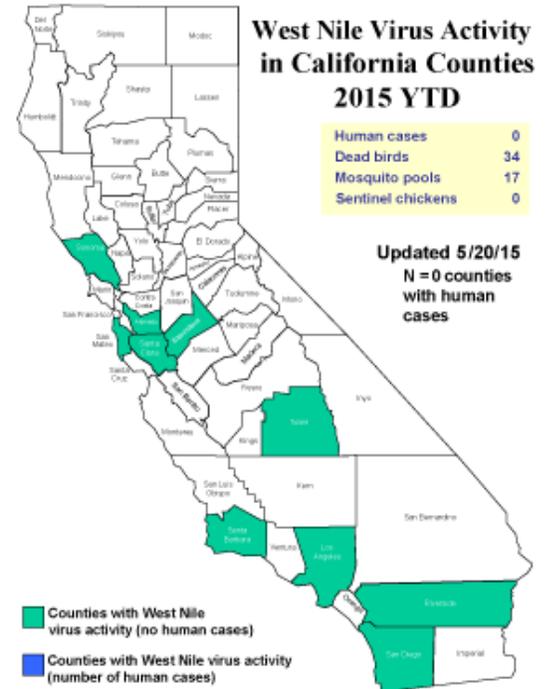
May 22, 2015

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

West Nile Virus Update

Orange County reports its first West Nile virus positive mosquito sample. This sample was collected last week in Tustin and tested by Orange County Mosquito and Vector Control District (OCMVCD). It is the first indication of West Nile virus (WNV) in the County this season.

- **Consider WNV infection in your patients with aseptic meningitis, encephalitis, or prolonged fever.** WNV testing should include serum WNV IgM and IgG, with CSF IgM for cases of neuroinvasive disease.
 - Testing is available through commercial laboratories and through OC Public Health on a case-by-case basis.
 - Repeat serology may be indicated if initial testing is negative in the first 10 days after symptom onset.
- **Report all cases of WNV infection to Orange County Public Health by phone (714-834-8180) or fax (714-834-8196) within one working day.** All cases of WNV infection are investigated by Public Health and sites of potential exposure are shared with Orange County Mosquito and Vector Control District (OCMVCD) so that they can identify, reduce and/or eliminate potential mosquito breeding sites in areas at increased risk of transmission.
- **Educate your patients, staff, and family about WNV prevention!**
 - Eliminate standing water on your property as this is where mosquitoes breed;
 - Make sure that door and window screens are installed and in good condition;
 - When outdoors, use an insect repellent with DEET, picaridin or oil of lemon eucalyptus;
 - Avoid being outdoors during dusk and dawn and wear long pants and long sleeves when outdoors.
 - Contact the OCMVCD to report dead birds or neglected pools: 714-971-2421 or 949-654-2421 or www.ocvcd.org.



WNV -- California: In California, ten other counties have reported WNV in birds and/or mosquitoes, including the surrounding counties of Los Angeles, Riverside and San Diego. Currently, no human cases have been reported. See map above.

Aedes Aegypti Mosquitoes Discovered in an Orange County Residence

- *Aedes Aegypti* was identified in an Anaheim residence in April. OCMVCD is continuing to conduct surveillance in the area to assure that the mosquito is not more widely spread. *A. Aegypti* can act as a vector to spread several viruses including chikungunya, dengue, and yellow fever. While there have been no locally-acquired cases of these viruses, travelers who acquire one of these infections could serve as a source of transmission if bitten by an *A. Aegypti* mosquito.
- **Suspected or confirmed cases of chikungunya, dengue, or yellow fever should be reported to Orange County Public Health by phone (714-834-8180) or fax (714-834-8196).**

July 31, 2015

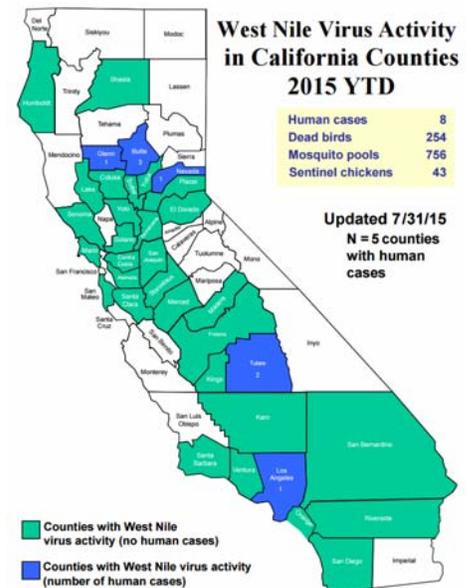
1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

West Nile Virus (WNV) Season is Here!

Health care providers should consider WNV infection in patients with aseptic meningitis, encephalitis, or prolonged fever and submit specimens for testing.

California reports its first West Nile Virus-associated fatality this season. The death occurred in an elderly Nevada County resident. This was the first reported case in California in 2015. Seven other symptomatic cases and two asymptomatic WNV-positive blood donors have also been reported. The majority of California counties, including Orange County, have reported West Nile Virus activity in the form of positive birds and mosquitoes (see map below). Nationally, 36 states have reported WNV activity as of July 28, 2015.

WNV – Orange County: Human cases are expected at any time. In previous years the first human infections of West Nile Virus usually occurred in July. So far this season as of July 23, 7 dead birds and 32 mosquito samples have tested positive for West Nile Virus. The majority of mosquito samples testing positive have been collected from a concentrated area in the city of Tustin. Orange County Mosquito and Vector Control District (OCMVCD) has begun treatment to control the mosquito population in the impacted neighborhood. For more information about mosquito control applications, visit <http://www.ocvcd.org/ARCFAQ.php>.



- **Clinical Description:**
 - The incubation period for WNV infection ranges from 2 to 14 days after a bite from an infected mosquito. The incubation period may be longer for immunosuppressed individuals.
 - Clinical syndromes ranging from febrile headache (West Nile Fever [WNF]) to aseptic meningitis, encephalitis, or acute flaccid paralysis (West Nile Neuroinvasive Disease [WNND]) may occur. Rash, myalgia, lymphadenopathy, and weakness may also be prominent.
- **Testing for WNV** should include serum WNV IgM and IgG, with CSF IgM also for cases of neuroinvasive disease. While there is no treatment for WNV, testing can guide patient management during the acute phase and recovery process and help mosquito control and public health identify areas to institute control measures to attempt to prevent further cases.
- **Report all WNV infections to Orange County Public Health by phone (714-834-8180) or fax (714-834-8196) within one working day.** All WNV infections are investigated by Public Health and sites of potential exposure are shared with OCMVCD to reduce and/or eliminate potential mosquito breeding sites in areas at increased risk of transmission.
- **Educate your patients, staff, and family about WNV prevention! This is especially important for those 50 years of age or older who are at increased risk for severe disease from WNV infection.**
 - Eliminate standing water on your property as this is where mosquitoes breed;
 - Make sure that door and window screens are installed and in good condition;
 - When outdoors, use an insect repellent with DEET, picaridin or oil of lemon eucalyptus. For information about repellent: <http://www.cdc.gov/westnile/faq/repellent.html>. For information about insect repellent use on children, visit the American Academy of Pediatrics website at: <https://www.healthychildren.org/English/safety-prevention/at-play/Pages/Insect-Repellents.aspx>.
 - Avoid being outdoors during dusk and dawn and wear long pants and long sleeves when outdoors.

September 4, 2015

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

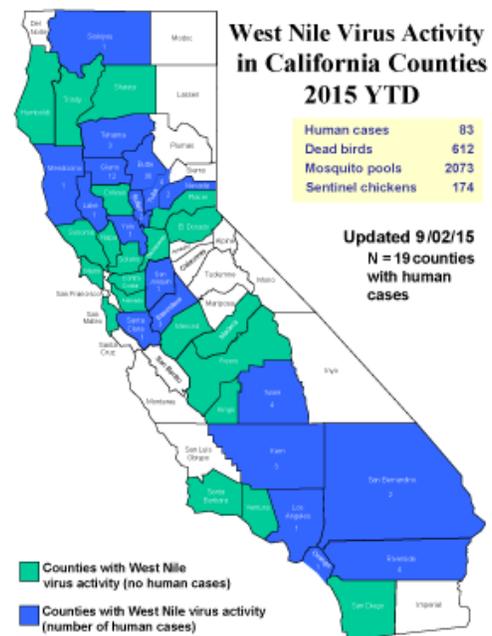
West Nile Virus (WNV) Activity is Increasing in Orange County

West Nile Virus season usually runs from April to November, with peak activity occurring in August and September. Health care providers should consider WNV infection in patients with compatible symptoms.

WNV- California & U.S.: As of September 2, California has a total of 83 human WNV cases, including 2 WNV-related fatalities. 26 of these cases were reported in the previous week. This compares to 125 WNV cases statewide at this time last year. 415 cases from 38 states and the District of Columbia, including 10 fatalities, have been reported nationally so far this season (as of Sept.1).

WNV – Orange County:

- **Human Cases:** Five human symptomatic cases (1 West Nile Fever and 4 West Nile Neuroinvasive Disease cases), and one asymptomatic blood donor have been reported from six cities in Orange County so far this year. All West Nile Neuroinvasive Disease cases are over 50 years of age and most have underlying medical conditions; both of these groups are at higher risk for severe disease.
- **Based on mosquito surveillance conducted by Orange County Mosquito and Vector Control District (OCMVCD), the risk level of WNV transmission to humans is currently high in several areas of the County.** In response, OCMVCD is implementing adult mosquito control measures, including aerial spraying of mosquito control product in high-risk areas. The aerial application will occur in the cities of Orange, Tustin, Villa Park, and portions of Anaheim, Fountain Valley, and Garden Grove, Santa Ana and Stanton between 10 p.m. and 4 a.m. on Wednesday, September 9, and Thursday, September 10 (weather permitting).
 - **For an interactive map of aerial spraying locations and schedule,** visit OCMVCD's webpage at: <http://www.ocvcd.org/>
 - **What you should know about mosquito control and pesticides:** http://www.westnile.ca.gov/wnv_faqs_basics.php?id=25



Testing for WNV:

- **Testing should be performed** for patients with prolonged fever, or those with neurologic symptoms including encephalitis, aseptic meningitis, acute flaccid paralysis, atypical Guillain-Barré syndrome, or transverse myelitis.
- **Testing should include** serum WNV IgM and IgG, with CSF IgM for cases of neuroinvasive disease.
- **Educate your patients, staff, and family about WNV prevention!**
 - Eliminate standing water on your property as this is where mosquitoes breed;
 - Make sure that door and window screens are installed and in good condition;
 - When outdoors, use an insect repellent with DEET, picaridin or oil of lemon eucalyptus;
 - Avoid being outdoors during dusk and dawn and wear long pants and long sleeves when outdoors.
 - **For additional educational resources, visit:** <http://www.westnile.ca.gov/resources.php>

September 25, 2015

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

Human Cases of West Nile Virus (WNV) continue to be reported in Orange County.

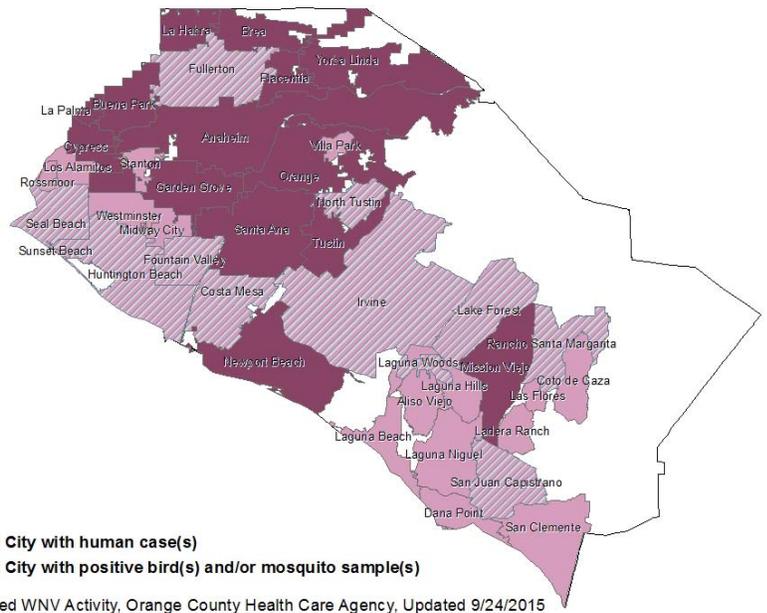
Health care providers should consider WNV infection in patients with a febrile or acute neurologic illness.

WNV- California & U.S.: As of September 25, 2015, California has a total of 201 human WNV cases, including 10 WNV-related fatalities. Nationally 877 cases, including 43 fatalities, have been reported this season (as of Sept.22).

WNV – Orange County:

- **Orange County reports its first WNV-associated fatality this season.** One fatal case of human WNV was reported in a resident from Buena Park. The patient, in their 80's, had underlying medical conditions putting them at increased risk for severe disease.
- **So far this year, 26 human cases of WNV and 2 asymptomatic blood donor have been reported in Orange County.** There is currently increased risk of WNV transmission in several areas of Orange County, with a concentration of human cases in Northern Orange County. WNV-positive birds and mosquitoes have been identified throughout Orange County. See map at right.

West Nile Virus Activity, Orange County 2015



Note: Cases are mapped by city of residence and may not indicate the location of exposure.

- **Educational Resources:**
<http://www.westnile.ca.gov/resources.php>
- **Clinical Management:**
<http://smartmedicine.acponline.org/content.aspx?gbosID=378>
- **Diagnosis: Testing should be performed on those patients with any of the following conditions:** encephalitis, aseptic meningitis, acute flaccid paralysis, atypical Guillain-Barré syndrome, transverse myelitis, or prolonged fever > 7 days.
 - **Testing should include** serum WNV IgM and IgG, with CSF IgM for cases of neuroinvasive disease.
 - WNV IgM may be negative early in the course of disease. Repeat serology may be indicated if initial testing was done ≤ 7 days after the onset of illness.
 - **For diagnosis of clinical disease, serological tests are more accurate than molecular tests.** Reverse Transcriptase - Polymerase Chain Reaction (RT-PCR) tests have low sensitivity for WNV, making them inappropriate as the sole test for laboratory diagnostic testing of possible human WNV infections. RT-PCRs may be useful for immunocompromised individuals that have a delay in antibody response and prolonged viremia.
 - **WNV serology may cross react with other flaviviruses** (e.g., dengue, St. Louis Encephalitis, or yellow fever including yellow fever vaccine). Check case history for travel to flavivirus-endemic areas, length of time between onset of symptoms and collection of specimen, vaccination history, etc.

October 19, 2015

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

Mosquitoes capable of transmitting chikungunya and dengue fever have been found in Mission Viejo.

- ***Aedes Aegypti* mosquitoes were identified in a Mission Viejo neighborhood.** The Orange County Mosquito and Vector Control District (OCMVCD) is working to eradicate the invasive mosquito by conducting neighborhood inspections, and treating areas of concern.
- ***A. Aegypti* can act as a vector to spread several viruses including chikungunya, dengue, and yellow fever.** While there have been no locally-acquired cases of these viruses, travelers who acquire one of these infections could serve as a source of transmission if bitten by an *A. Aegypti* mosquito.
 - People infected with chikungunya or dengue virus should be protected from further mosquito exposure during the first few days of illness to reduce the risk of local transmission.
 - Orange County residents are encouraged to report day biting mosquitos or any sightings of *Aedes Aegypti* mosquitos, which are characterized by white banded legs (see picture at right) to OCMVCD at 714-971-2421.
 - Patients clinical and international travel history that is suspicious for chikungunya, dengue, or yellow fever should be reported to Orange County Public Health by phone (714-834-8180) or fax (714-834-8196) to facilitate diagnosis and to mitigate the risk of local transmission.

For additional clinical information, see <http://www.cdc.gov/chikungunya/> or <http://www.cdc.gov/dengue/traveloutbreaks/index.html>.

Dengue Fever is characterized by sudden onset of fever for 2-7 days (can be biphasic), intense headache, myalgia, arthralgia, retro-orbital pain, anorexia, nausea, vomiting and rash.

Chikungunya is characterized by acute onset of fever and polyarthralgia. In addition to severe joint pains, other symptoms may include headache, myalgia, arthritis, or rash.

Both dengue and chikungunya are now endemic to many parts of the world, including Mexico, the Caribbean, Africa, Asia and the Pacific.

For questions regarding chikungunya or dengue epidemiology or testing, contact Epidemiology at 714-834-8180.



Aedes Aegypti mosquito

Orange County continues to see West Nile virus activity. Consider WNV infection in your patients with aseptic meningitis, encephalitis, or prolonged fever and submit serology (WNV IgG and IgM) for testing.

West Nile virus (WNV) Update: Orange County usually sees a slowing of WNV activity in October. However, human cases continue to be reported in high numbers. So far this season 47 cases, including two WNV-related, fatalities have been reported. Human cases have been reported as late as December in Orange County. For information on diagnosis and treatment, visit: <http://www.cdc.gov/westnile/healthcareproviders/index.html>.

Educate your patients and family on the prevention of mosquito-borne diseases

- Eliminate standing water on your property as this is where mosquitoes breed;
- Make sure that door and window screens are installed and in good condition;
- When outdoors, use an insect repellent with DEET, picaridin or oil of lemon eucalyptus;
- Wear long pants and long sleeves when outdoors.

For comments or suggestions on this newsletter, please contact Sandra Okubo, MPH, or Matt Zahn, MD at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.



November 17, 2015

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

Mosquitoes capable of transmitting chikungunya and dengue viruses have been detected in multiple areas around Orange County. Physicians should consider and test for these illnesses in patients with a compatible clinical presentation and recent history of international travel.

- **Both the yellow fever mosquito (*Aedes aegypti*) and the Asian tiger mosquito (*Aedes albopictus*) have been found in multiple communities in Orange County.** These mosquitoes are small and aggressive and frequently bite during the daytime. For more information on the current mosquito situation in Orange County, visit the Orange County Mosquito and Vector Control web page at www.ocvcd.org/.
- ***A. aegypti* and *A. albopictus* mosquitoes can act as vectors to spread viruses including chikungunya, dengue and yellow fever.** The risk of imported dengue or chikungunya viruses sparking a local outbreak is low. However, spread could occur locally if a traveler infected abroad returns home and is bitten by a mosquito that could then carry the virus to bite and infect more people.
 - People infected with chikungunya or dengue should avoid mosquito exposure during the first few days of illness to reduce the risk of local transmission.
 - **To report suspect or confirmed cases of chikungunya or dengue fever, or for information on testing for these viruses, contact OCHCA Epidemiology by phone (714-834-8180) or fax (714-834-8196).**

Dengue fever symptoms: Sudden onset of fever for 2-7 days (can be biphasic), intense headache, myalgia, arthralgia, retro-orbital pain, anorexia, nausea, vomiting and rash. For more information, visit:

<http://www.cdc.gov/dengue/traveloutbreaks/index.html>.

Chikungunya symptoms: Acute onset of fever and polyarthralgia. In addition to severe joint pains, other symptoms may include headache, myalgia, arthritis, or rash. For more information, see:

<http://www.cdc.gov/chikungunya/>

Both dengue and chikungunya are now endemic to many parts of the world, including Mexico, the Caribbean, Africa, Asia and the Pacific.

West Nile virus activity is slowing in Orange County, but cases continue to be reported. Consider WNV infection in patients with acute febrile or neurologic illness.

West Nile virus (WNV) Update: So far this season 86 infections have been reported, including four WNV-related fatalities. Human cases have historically been reported as late as December in Orange County. For information on diagnosis and treatment, visit: <http://www.cdc.gov/westnile/healthcareproviders/index.html>.

Educate your patients and family on the prevention of mosquito-borne diseases

- REPORT any sightings of small, black-and-white mosquitoes, or if you are being bitten by mosquitoes during the day, by calling (714) 971-2421 or (949) 654-2421.
- Dump and drain all stagnant water around your home. Eliminate plant saucers and other unnecessary containers that could be a possible breeding source.
- Clean bird baths and pet-watering dishes weekly and dump the water from overflow dishes under potted plants and flower pots.
- Do not transport or share plant stems rooted in water.
- Be sure window and door screens are in good repair to prevent mosquitoes from entering your home.
- Use insect repellent containing EPA-registered active ingredients such as DEET®, Picaridin, or Oil of Lemon Eucalyptus to avoid bites.

For comments or suggestions on this newsletter, please contact Sandra Okubo, MPH, or Matt Zahn, MD at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.



February 22, 2016

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

Zika Virus Infection: Current Recommendations for Orange County Medical Providers

- **Zika virus** is a mosquito-borne flavivirus, in the same genus as the yellow fever, dengue fever, and West Nile viruses. About 80% of Zika virus infections are asymptomatic. For those that develop illness, symptoms generally occur 3 to 7 days after infection, are usually mild, and last several days to a week. Aside from congenital infection, serious illness is rare. Symptoms include some combination of acute onset of fever, maculopapular rash, arthralgia, or conjunctivitis. Other commonly reported symptoms include myalgia and headache.
- **Zika virus and pregnancy:** A large outbreak of Zika virus infection in Brazil in 2015 was temporally related to a dramatic increase in the number of infants born with microcephaly in that country. Zika virus has been isolated in fetal brain tissue in the setting of microcephalic disease (NEJM 2016 Feb 10) and in amniotic fluid of pregnant women with microcephalic fetuses (Lancet Infect Dis. 2016 Feb 17). Ongoing research is evaluating the nature of association between Zika virus infection during pregnancy and development of fetal microcephaly.
- **Sexual transmission of Zika virus** has been documented, and is of particular concern during pregnancy. Men who reside in or have traveled to an area of active Zika virus transmission and who have a pregnant partner should abstain from sexual activity or consistently and correctly use condoms during sex (i.e., vaginal intercourse, anal intercourse, or fellatio) for the duration of pregnancy.
- **Reports have linked Zika virus infection with Guillain-Barre Syndrome (GBS).** CDC is working with the Brazilian Ministry of Health to further study whether there is an association. All cases of GBS in persons with a history of travel to countries with Zika spread should be reported to the Orange County Health Care Agency.

Zika Virus Infection and Travel

- **The CDC has issued a travel alert** for people visiting regions where Zika virus transmission is ongoing: <http://wwwnc.cdc.gov/travel/page/zika-travel-information>. The vast majority Latin American countries currently have evidence of local spread. Pregnant women should consider postponing travel to these areas, and those who must travel should be counseled on the risk and steps to avoid mosquito bites. For the latest review of affected countries visit: http://www.paho.org/hq/index.php?option=com_content&view=article&id=11669&Itemid=41716&lang=en.

Zika Virus and Aedes Mosquitoes

- **Zika virus is transmitted** primarily by the bite of *Aedes aegypti* or *Aedes albopictus* mosquitoes. Currently, there is no local transmission of Zika virus in the continental US and the risk of imported Zika virus causing a local outbreak is low. However, both *Aedes* species have been identified in Orange County in the last year, and local spread could occur if an infected traveler returns home and is bitten by a mosquito that could then carry the virus to other people. People with suspected infection with Zika, chikungunya or dengue viruses should avoid mosquito exposure during the first week of illness to reduce the risk of local transmission.

For comments or suggestions on this newsletter, please contact Sandra Okubo, MPH, or Matt Zahn, MD at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.

Zika Virus Testing

- **All laboratory testing for Zika virus currently must occur in concert with local public health. No private clinical laboratories offer Zika testing at present. To report suspect/confirmed cases of Zika, or for information on testing, contact the Orange County Health Care Agency Epidemiology and Assessment Program at 714-834-8180.**

Testing for Symptomatic Patients

- When ≤ 7 days from symptom onset, Zika serum PCR and serum IgM and PRNT (Plaque-reduction neutralization) testing should be performed. When more than 7 days have elapsed from onset, only Zika serum IgM and PRNT testing are indicated. A positive IgM result does not always indicate Zika virus infection and can be difficult to interpret since cross-reactivity can occur with related flaviviruses (e.g., dengue, Japanese encephalitis, West Nile, yellow fever). PRNT testing can help confirm Zika virus disease in this situation.
- CDC is assessing the utility of testing urine for Zika virus. Urine PCR testing should be performed for persons who are tested within 30 days of developing symptoms.
- Zika virus infection symptoms overlap with those of dengue and chikungunya. All symptomatic persons tested for Zika should be tested for all three infections.

Testing for Specific Populations

- **Testing for Zika virus infection is recommended for pregnant women** who have a history of travel to an area with Zika virus transmission during pregnancy AND report two or more symptoms* consistent with Zika virus disease within two weeks of return; OR have an ultrasound finding of fetal microcephaly or intracranial calcifications.
- **Asymptomatic pregnant women** who have a history of travel to an area where Zika virus spread has been identified can be tested at the discretion of their provider. Serologic testing within 2 to 12 weeks after travel is considered most reliable (validity of test results outside of the 2-12 week travel window is uncertain for asymptomatic individuals).
- **Men and nonpregnant women with a history of symptoms* within two weeks of travel** to a region with Zika virus spread may be considered for testing based on risk of infection in consultation with public health.
- **Testing of infants with possible congenital Zika virus infection** who were born to mothers who traveled to or resided in areas affected by Zika virus during pregnancy should be guided by 1) whether the infant had microcephaly or intracranial calcifications detected prenatally or at birth and 2) the mother's Zika virus testing results. Testing should also be performed for infants who have 2 or more symptoms of acute infection* in the first 2 weeks of life and whose mother traveled to or resided in an affected area within 2 weeks of delivery.

*fever, rash, arthralgia, or conjunctivitis

CDC Interim Guidelines for Medical Providers:

- Caring for pregnant women and women of reproductive age with possible Zika virus exposure: www.cdc.gov/mmwr/volumes/65/wr/pdfs/mm6505e2er.pdf.
- Caring for infants and children with suspected Zika virus infection: http://www.cdc.gov/mmwr/volumes/65/wr/mm6507e1er.htm?s_cid=mm6507e1.htm_w.
- Prevention of sexual transmission of Zika virus: www.cdc.gov/mmwr/volumes/65/wr/mm6505e1er.htm?s_cid=mm6505e1.htm_w.



March 10, 2016

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

First Zika Virus Infection Confirmed in Orange County Resident

- **A Costa Mesa resident has been diagnosed with Zika infection.** He developed a mild illness in early February shortly after returning from travel to Central America and has since recovered. His diagnosis was confirmed with serologic testing results, which were reported this week by the CDC. Fourteen Zika virus cases have been reported in California residents in 2015 and 2016, all occurring after international travel.
- **The CDC has issued travel alerts** for people visiting regions where Zika virus transmission is ongoing; the notice can be found at <http://wwwnc.cdc.gov/travel/page/zika-travel-information>. The majority of Latin American countries currently have evidence of local spread. Pregnant women should consider postponing travel to these areas, and those who must travel should be informed of the risks and given counseling on methods to avoid mosquito bites. For the latest list of affected countries visit <http://www.paho.org>.
- **Zika symptoms:** About 80% of Zika virus infections are asymptomatic. For those that develop illness, rash is the most commonly reported symptom. The rash is macular or maculopapular and frequently pruritic. Fever, arthralgia, and conjunctivitis also occur. Symptoms generally begin 3 to 7 days after infection, are usually mild, and last several days to a week. (Duffy et al, NEJM 2009 Jun 11; Brasil, et al, NEJM 2016 Mar 8).
- **Zika virus and pregnancy:** Zika virus infection during pregnancy is associated with fetal disease, particularly microcephaly. Zika virus has been isolated in fetal brain tissue in the setting of microcephalic disease (Mlakar et al, NEJM 2016 Feb 10) and in amniotic fluid of pregnant women with microcephalic fetuses (Jouannic et al, Lancet 2016 Mar 1). A small cohort study which followed pregnant women who were infected with Zika virus during pregnancy found that ultrasound abnormalities occurred in 29% of cases (Brasil et al, NEJM 2016 Mar 8). Research is ongoing to evaluate the risks associated with Zika virus infection during pregnancy.
- **Sexual transmission of Zika virus** from male to female has been documented in multiple cases, and is of particular concern during pregnancy. Zika virus has been found in semen 62 days after onset of symptoms. It is unknown at this point how long the risk of sexual transmission persists. Men who reside in or have traveled to an area of active Zika virus transmission and who have a pregnant partner should abstain from sexual activity or consistently and correctly use condoms during sex (i.e., vaginal intercourse, anal intercourse, or fellatio) for the duration of pregnancy. If a male traveler's partner is not pregnant, but there is concern for possible transmission, then the couple should consider abstaining from sexual activity or using condoms.
- **Reports have linked Zika virus infection with Guillain-Barre Syndrome (GBS).** A recent study of an outbreak in French Polynesia found that GBS occurred at a rate of 0.24 per 1000 Zika virus infections. Most of those who developed GBS had classic initial Zika symptoms, followed by onset of GBS symptoms 4-10 days later (Cao-Lorneau et al, Lancet 2016 Feb 29).
- **Zika virus is transmitted** primarily by the bite of *Aedes aegypti* or *Aedes albopictus* mosquitoes. Both mosquitoes have been identified in Orange County in the last year. Currently, there is no local transmission of Zika virus in the continental US and the risk of imported Zika virus causing a local outbreak is low. However, both *Aedes* species have been identified in Orange County in the last year, and local spread could occur if an infected traveler returns home and is bitten by a mosquito that could then carry the virus to other people.

For comments or suggestions on this newsletter, please contact Sandra Okubo, MPH, or Matt Zahn, MD at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.

Zika Virus Testing

- **All laboratory testing for Zika virus currently must occur in concert with local public health. No private clinical laboratories currently offer Zika testing. To report suspect/confirmed cases of Zika, chikungunya or dengue fever, or for information on testing for these viruses, contact the Orange County Health Care Agency Epidemiology and Assessment Program at 714-834-8180.**

Testing for Symptomatic Patients

- When ≤ 7 days from symptom onset, Zika serum PCR and serum IgM and PRNT testing should be performed. When more than 7 days have elapsed from onset, only Zika serum IgM and PRNT testing are indicated. A positive IgM result does not always indicate Zika virus infection and can be difficult to interpret since cross-reactivity can occur with related flaviviruses (e.g., dengue, Japanese encephalitis, West Nile, yellow fever). PRNT testing can help confirm Zika virus disease in this situation.
- CDC is assessing the utility of testing urine for Zika virus. Urine PCR testing should be performed for persons who are tested within 30 days of developing symptoms.
- Zika virus infection symptoms overlap with those of dengue and chikungunya. All symptomatic persons tested for Zika will be tested for all three infections.

Testing for Specific Populations

- **Testing for Zika virus infection is recommended for pregnant women who** have a history of travel to an area with Zika virus transmission during pregnancy AND report two or more symptoms* consistent with Zika virus disease within two weeks of return; OR have an ultrasound finding of fetal microcephaly or intracranial calcifications
- **Asymptomatic pregnant women** who have a history of travel to an area where Zika virus spread has been identified can be tested at the discretion of their provider. Serologic testing within 2 to 12 weeks after travel is considered most reliable (validity of test results outside of the 2-12 week travel window are uncertain for asymptomatic individuals).
- **Men and nonpregnant women with a history of symptoms* within two weeks of travel** to a region with Zika virus spread may be considered for testing based on risk of infection in consultation with public health.
- **Testing of infants with possible congenital Zika virus infection** who were born to mothers who traveled to or resided in areas affected by Zika virus during pregnancy should be guided by 1) whether the infant had microcephaly or intracranial calcifications detected prenatally or at birth and 2) the mother's Zika virus testing results. Testing should also be performed for infants who have 2 or more symptoms* in the first 2 weeks of life and whose mother traveled to or resided in an affected area within 2 weeks of delivery.

*fever, rash, arthralgia, or conjunctivitis

CDC Interim Guidelines for Medical Providers:

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- Caring for infants and children with suspected Zika virus infection: http://www.cdc.gov/mmwr/volumes/65/wr/mm6507e1er.htm?s_cid=mm6507e1.htm_w.
- Prevention of sexual transmission of Zika virus: www.cdc.gov/mmwr/volumes/65/wr/mm6505e1er.htm?s_cid=mm6505e1.htm_w.

May 20, 2016 revised

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

West Nile Virus Update

Revised: OCMVCD website is www.ocvcd.org

Orange County reported its first West Nile virus (WNV) positive mosquito samples and dead birds this week. These are the first indications of WNV in Orange County this year. See the Orange County Mosquito and Vector Control District (OCMVCD) website, www.ocvcd.org, for more information about mosquito and bird testing. **No human cases have been reported yet this season in California.** The first human cases in Orange County are typically reported in June or July. Now is a great time to remind patients, families, friends and neighbors to remove sources of standing water from around their homes and make sure their windows and screens are in good repair to decrease their risk of WNV infection.

WNV Update – CA: As of May 20, 2016, six California counties beside Orange County have reported WNV activity in the form of positive dead birds and/or mosquito samples: Los Angeles, Riverside, Sacramento, San Diego, Santa Clara, and Solano. See map at right:

- **Clinical Description:**

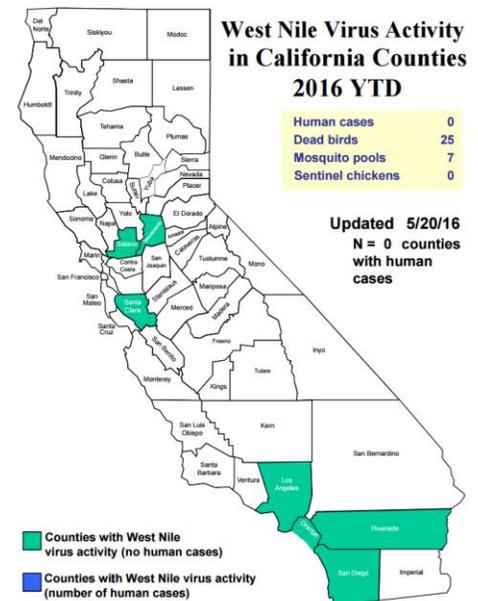
- The incubation period for WNV infection ranges from 2 to 14 days after a bite from an infected mosquito, and may be longer in immunosuppressed individuals.
- Clinical syndromes ranging from febrile headache to aseptic meningitis, encephalitis, or acute flaccid paralysis may occur. Rash, myalgia, lymphadenopathy, and weakness may also be prominent. However, 70-80% of infections may be asymptomatic.

- **Testing for WNV:**

- Send serum for WNV IgM and IgG in suspect WNV cases, and also CSF WNV IgM in cases of neuroinvasive disease. While there is no treatment for WNV, results of testing can guide clinical management during the diagnostic and recovery process and contribute to surveillance efforts to direct mosquito control to help prevent further cases.

- **Help with surveillance of West Nile virus in the community:**

- **Report all WNV infections to Orange County Public Health by phone (714-834-8180) or fax (714-834-8196) within 1 working day.** All infections are investigated by Public Health and sites of potential exposure are shared with OCMVCD to reduce/eliminate potential mosquito breeding sites.
- **Report dead birds for West Nile virus testing:** www.ocvcd.org/vectors.php.



Zika Virus Update

To date there have been no local mosquito-borne Zika cases in the United States.

- **Zika Update – OC & CA:** As of May 20, 2016, there have been 49 travel-associated cases of Zika in California residents, including two in Orange County. For areas with active Zika virus transmission, visit: www.cdc.gov/zika/geo/index.html.
- **Zika Virus FAQs for Health Care Providers**
 CDPH: www.cdph.ca.gov/HealthInfo/discond/Documents/ZIKAVirusFAQsforHealthCareProviders.pdf
 CDC: www.cdc.gov/zika/hc-providers/index.html
- **CDC Tools for Healthcare Providers:** www.cdc.gov/zika/hc-providers/tools.html



July 29, 2016

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

Cases of travel-associated Zika virus infection continue to be reported in Orange County

Situation Update:

- **Orange County:** 8 cases, all travel-related
- **California:** As of July 29, 114 travel-associated infections from 22 counties have been reported, 1 sexually acquired.
- **US:** As of July 27, 1,657 travel-associated cases, 15 sexually transmitted, 5 with Guillain-Barre Syndrome.
- **Mexico:** Locally acquired cases have been reported in multiple states. At this time there have been no reports of local transmission in Baja or Sonora.

New Developments:

- **The first reported occurrence of female-to-male sexual transmission of Zika virus was identified in a New York City resident:**
<http://www.cdc.gov/mmwr/volumes/65/wr/mm6528e2.htm>
Pregnant women with sex partners (male or female) who live in or who have traveled to an area with active Zika virus transmission should consistently and correctly use barriers against infection during sex or abstain from sex for the duration of the pregnancy.
 - Interim Guidance for Prevention of Sexual Transmission of Zika Virus – United States, July 2016
http://www.cdc.gov/mmwr/volumes/65/wr/mm6529e2.htm?s_cid=mm6529e2_e
 - Interim Guidance for Health Care Providers Caring for Women of Reproductive age with Possible Zika Virus Exposure – United States, 2016
<http://www.cdc.gov/mmwr/volumes/65/wr/mm6512e2.htm>
- **Apparent local Zika transmission in Florida:** Four cases have been identified without a history of travel. These are the first locally acquired cases in the US. Door-to-door outreach is being conducted in the impacted area located in Miami-Dade County. <http://www.floridahealth.gov/newsroom/2016/07/072916-local-zika.html>
- **Possible nonsexual person-to-person transmission of Zika virus** was reported in a Utah man who had been caring for his father with Zika virus. There have been no reports of Zika virus being passed to healthcare workers. Standard precautions are recommended for healthcare providers when caring for Zika patients. <http://udohnews.blogspot.com/2016/07/public-health-officials-investigating.html>

Testing for Zika Virus: Private laboratories (Quest & Lab Corp) are now performing PCR testing for Zika virus for symptomatic patients. Zika PCR testing is sensitive in serum up to 7 days and in urine up to 21 days after the start of symptoms. To rule out infection, symptomatic patients with **negative RT-PCR tests must also have serologic Zika IgM testing, which is currently performed only at public health laboratories.** Testing FAQs (updated 7/5): <http://www.cdph.ca.gov/HealthInfo/discond/Pages/Zika.aspx>

CDC Travel Alert:

- Pregnant women should consider postponing travel to regions where Zika virus transmission is ongoing. For more travel information, see <http://wwwnc.cdc.gov/travel/page/zika-travel-information>.
- **The Olympic Summer games will begin in Rio de Janeiro next week (8/5 – 8/21).** Physicians should remain vigilant for returning travelers who may have been infected with Zika virus during their travels.

Suspect or confirmed cases of Zika Virus infection are reportable immediately to the OCHCA Epidemiology and Assessment Program at 714-834-8180.

For comments or suggestions on this newsletter, please contact Sandra Okubo, MPH, or Matt Zahn, MD at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.

Zika Basics:

Transmission: Primarily by the bite of an infected *Aedes aegypti* or *Aedes albopictus* mosquito. Both mosquitoes have been sporadically detected in Orange County.

Symptoms: Acute onset of fever, maculopapular rash, arthralgia, and conjunctivitis 3 to 7 days after exposure. The majority of infections are asymptomatic.

Zika virus and pregnancy outcome: Zika virus can be passed in utero or perinatally, which can result in birth defects, particularly microcephaly and ocular disease.

Presentation on Zika Virus for Clinicians:
<http://www.cdc.gov/zika/pdfs/clinicianppt.pdf>

August 5, 2016

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

West Nile Virus (WNV) Season is Here

Consider WNV infection in patients with aseptic meningitis, encephalitis, atypical Guillain Barre syndrome, or prolonged fever (≥ 7 days) and submit serology for testing.

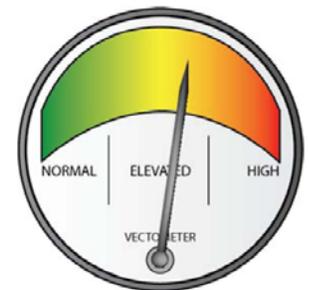
Orange County reports its first human WNV case this season. The patient, an adult female who resides in Anaheim, had onset of illness and was admitted to the hospital in July with encephalitis. Health care providers should remain vigilant for patients with possible WNV infection. WNV activity is increasing in Orange County and more cases are expected in coming weeks and months.

- **The Orange County Mosquito and Vector Control District (OCMVCD) has detected positive birds and mosquitoes in multiple areas in Orange County** and have determined that there is currently an elevated risk of WNV transmission (see picture at right). For OCMVCD map of WNV activity:

http://www.ocvcd.org/Maps/2016_update_map.jpg

- **To report dead birds for West Nile virus testing:**
<http://www.ocvcd.org/vectors.php>.

Orange County July 2016 –
Overall WNV threat is
ELEVATED



WNV Update – CA: California has reported 10 WNV cases in 8 counties this year to date; the first WNV death was recently reported in Sacramento County. The California Department of Public Health is reporting increased WNV activity across the State.

Graphic courtesy of OCMVCD

Prevention – Avoiding mosquito bites is the best way to prevent WNV infection:

- Use an insect repellent containing active ingredients registered with the U.S. Environmental Protection Agency when outdoors. Active ingredients include DEET, picaridin, and oil of lemon eucalyptus. Natural bug sprays may not be effective against mosquitoes. Want to ensure you are protected? Visit <http://www.cdc.gov/westnile/faq/repellent.html> for more information.
- Eliminate any standing water around your home or workplace.
- Ensure windows and door screens are in good repair.
- Other strategies to protect yourself against mosquito bites include staying indoors at dusk and dawn, when mosquitoes are most active.

Clinical Description:

- The incubation period for WNV infection ranges from 2 to 14 days after a bite from an infected mosquito, and may be longer in immunosuppressed individuals.
- Clinical syndromes ranging from febrile headache to aseptic meningitis, encephalitis, or acute flaccid paralysis may occur. Rash (generally transient, maculopapular), myalgia, lymphadenopathy, and weakness may also be prominent.

Clinical Diagnosis:

- Testing for WNV should include serum WNV IgM and IgG, with CSF IgM for cases of neuroinvasive disease. Repeat serology may be indicated if initial testing was done ≤ 7 days after the onset of illness.
- WNV serology may cross react with other flaviviruses (e.g., dengue, St. Louis Encephalitis, Zika or yellow fever including yellow fever vaccine). A positive WNV IgG with negative IgM may reflect old flavivirus infection, and does NOT rule out acute WNV infection.

Disease Reporting: WNV infection, aseptic meningitis, and encephalitis are all reportable conditions. Report suspect/confirmed cases to Orange County Epidemiology (phone: 714-834-8180 / fax: 714-834-8196).

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August 23, 2016

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

West Nile Virus (WNV) Activity Continues to Increase in Orange County

WNV - OC: Orange County Mosquito and Vector Control District has reported above average WNV activity in birds and mosquitoes, and have assessed the risk of transmission to humans to be high at this time. So far this season, there have been 3 human infections reported in Orange County.

WNV Update – CA: As of 8/19, there have been 46 human cases of WNV reported in California, including 24 reported in the last week.

Orange County WNV Infections by Type (as of 8/23/16)

West Nile Neuroinvasive	1
West Nile Fever	0
Asymptomatic	2
Classification Pending	0
Total Infections	3
Total Deaths	0

Clinical Description:

- The incubation period for WNV infection ranges from 2 to 14 days. Clinical syndromes range from febrile headache to aseptic meningitis, encephalitis, or acute flaccid paralysis. Rash, myalgia, lymphadenopathy, and weakness may also be prominent.

Clinical Diagnosis:

- Testing for WNV should include serum WNV IgM and IgG, with CSF IgM for cases of neuroinvasive disease (SLEV testing should also be considered in cases of encephalitis, see note below). Repeat serology may be indicated if initial testing was done ≤ 7 days after the onset of illness.

Disease Prevention – Avoiding mosquito bites is the best way to prevent infection:

- Use an insect repellent with active ingredients, such as DEET, Picaridin, Oil of Lemon Eucalyptus or IR 3535.
- Eliminate any standing water around your home or workplace.
- Ensure windows and door screens are in good repair.
- Stay indoors at dusk and dawn, when mosquitoes are most active.

Mosquitoes have tested positive for Saint Louis Encephalitis Virus (SLEV) in Orange County

Two mosquito samples from the city of Garden Grove have tested positive for SLEV. SLEV was last known to be circulating in Orange County prior to 2004. Physicians should consider SLEV as well as WNV in patients with encephalitis symptoms.

Clinical Description: SLEV disease generally presents with fever along with neurologic symptoms that can include some combination of severe headache, aseptic meningitis, and/or encephalitis. The disease is generally milder in children and more severe in older adults, with almost 90% of elderly persons with SLEV disease developing encephalitis.

Laboratory Diagnosis: Both WNV and SLEV can be identified by testing for IgM- and IgG-specific antibody in serum and IgM testing in CSF, often as part of an arboviral panel. Testing is available commercially; OCHCA can assist with arranging patient testing if needed.

Disease Reporting: WNV infection, St. Louis encephalitis, aseptic meningitis, and encephalitis are all reportable conditions. Report suspect/confirmed cases to Orange County Epidemiology (phone: 714-834-8180 / fax: 714-834-8196).

For comments or suggestions on this newsletter, please contact Sandra Okubo, MPH, or Matt Zahn, MD at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.

Cases of West Nile Virus (WNV) Continue to be Reported in Orange County

Orange County WNV Infections by Type (as of 10/3/16)

West Nile Neuroinvasive	20
West Nile Fever	4
Asymptomatic	3
Total Infections	27

WNV - OC: Five new WNV cases were reported last week in Orange County, for a total of 27 infections to date this season (see chart at left). Physicians should continue to stay alert to possible cases over the coming weeks.

WNV Update – CA: As of 9/30, there have been 276 human cases of WNV reported in California, including 9 fatalities.

Clinical Description:

- The incubation period for WNV infection ranges from 2 to 14 days after a bite from an infected mosquito. Clinical syndromes range from febrile illness to aseptic meningitis, encephalitis, or acute flaccid paralysis.

Clinical Diagnosis:

- Testing for WNV should include serum WNV IgM and IgG, with CSF IgM for cases of neuroinvasive disease (St. Louis Encephalitis virus testing should also be considered in cases of encephalitis). Repeat serology may be indicated if initial testing was done ≤ 7 days after the onset of illness.

- **Clinical Management:** Weakness may be a prominent finding in patients with WNV. Evaluate and document motor strength and reflexes in all patients with possible WNV infection and monitor hospitalized WNV patients for respiratory weakness and need for respiratory support. More information on clinical management can be found at: <http://www.cdc.gov/ncidod/dvbid/westnile/clinicians/>.

Protect yourself from West Nile Virus:

- **Prevent mosquito bites when outdoors: (1)** Use an insect repellent with proven ingredients, including DEET, Picaridin, and oil of lemon eucalyptus. The repellent/insecticide permethrin can be used on clothing, and remains effective through several washes. For information about insect repellent use on children, visit the American Academy of Pediatrics website at: <http://www.healthychildren.org/English/safety-prevention/at-play/Pages/Insect-Repellents.aspx>. **(2)** Wear long-sleeved shirts and long pants when you are outdoors. Cover baby carriages or outdoor playpens with mosquito netting.
- **Eliminate any standing water around your home or workplace.** Mosquitoes can breed in any puddle or standing water that lasts more than four days. Keep swimming pools clean and properly chlorinated and aerate ornamental ponds or stock them with fish.
- **Ensure windows and door screens are in good repair.**

Typhus in Orange County

Orange County has seen a recent increase in endemic (flea-borne) typhus cases. Eleven cases have been reported so far this year. Exposure to flea-infested animals, particularly cats or possums, is a primary risk factor.

Clinical Description & Diagnosis: Common symptoms of typhus include fever, headache, malaise, and sometimes nausea and vomiting. Rash (macular or maculopapular) is present in about 50% of patients, typically appearing on days 4-7 of illness and lasting 4-8 days. Diagnosis is mainly through serology (IgM and IgG, or paired acute and convalescent IgG) for *R. typhi*.

Treatment: Doxycycline is first line therapy, and should be started empirically as soon as a diagnosis of typhus is suspected.

October 12, 2016

1719 W. 17th St. Santa Ana, CA 92706, (714) 834-8180

Cases of travel-associated Zika virus infection continue to be reported in Orange County

Zika Virus Update



Background: Zika virus is a mosquito-borne virus that is causing outbreaks in many countries and territories. Zika virus can be passed in utero and cause birth defects, particularly microcephaly. The majority of infections are asymptomatic. Symptomatic individuals often experience some combination of acute onset of fever, maculopapular rash, arthralgia, and conjunctivitis 3 to 14 days after exposure.

Situation Update:

- **Orange County:** 23 cases, all travel-related
- **California:** As of Oct 7, 328 travel-associated infections have been reported (3 sexually acquired). The most frequented countries or territories of Zika exposure include Mexico, Nicaragua, Guatemala, El Salvador, the Dominican Republic, Puerto Rico, and Honduras.
- **US States:** As of Oct 5, 3,712 travel-associated cases, 30 sexually transmitted, 13 with Guillain-Barre Syndrome have been reported. Florida has reported 147 locally-acquired cases (as of Oct 11). Active transmission continues to occur in a small area of Miami Beach.
- For countries and territories with active Zika virus transmission, see <http://www.cdc.gov/zika/geo/index.html>

Current CDC recommendations for couples considering attempting conception (Updated Sept 30):

- Men with possible Zika virus exposure through travel or sexual contact should wait to conceive until at least 6 months after symptom onset (if symptomatic) or last possible Zika virus exposure (if asymptomatic).
- Women with possible Zika virus exposure through travel or sexual contact should wait to conceive until at least 8 weeks after symptom onset (if symptomatic) or last possible Zika virus exposure (if asymptomatic).

Testing for Zika Virus:

For symptomatic patients, testing recommendations vary according to symptom onset. Given the overlap in clinical presentation and geographic distribution with chikungunya and dengue infections, patients with suspect Zika infection should generally be tested for these viral infections as well.

All pregnant women should be assessed for Zika virus exposure at each prenatal care visit. Possible exposures to Zika virus that warrant testing include:

- Travel to or residence in an area with a current Zika outbreak OR
- Sex with a partner who has traveled to or resides in an area with a current Zika outbreak
- For a testing algorithm for pregnant women, visit: http://www.cdc.gov/zika/pdfs/testing_algorithm.pdf.

Recommendations for Travelers:

Travelers to areas with active Zika virus transmission should take steps to prevent mosquito bites while traveling. Because mosquitoes that transmit Zika virus (*Aedes aegypti* & *Aedes albopictus*) have been sporadically detected in Orange County, they should continue to practice mosquito-avoidance measures for 3 weeks after return, regardless of symptom status, to prevent the spread of Zika virus locally.

Other Resources:

- FAQ for Health Care Providers (Updated Oct 4): <http://www.cdph.ca.gov/HealthInfo/discond/Documents/ZIKAVirusFAQsforHealthCareProviders.pdf>
- For additional information, visit: <http://www.cdph.ca.gov/HealthInfo/discond/Pages/Zika.aspx>

Suspect or confirmed cases of Zika virus infection are reportable immediately to the OCHCA Epidemiology and Assessment Program by phone at 714-834-8180.

For comments or suggestions on this newsletter, please contact Sandra Okubo, MPH, or Matt Zahn, MD at (714) 834-8180. To receive this newsletter by email, please contact us at epi@ochca.com.



First West Nile Virus-Associated Death of 2016 Reported in Orange County. West Nile virus season usually runs through October in Orange County, but cases have been diagnosed as late as December. Physicians should continue to stay alert to possible cases over the coming weeks.

WNV Update - OC:

- **The first West Nile virus (WNV) death of the 2016 season was reported this week.** The La Habra resident was in their late 60s and had multiple underlying medical conditions. The patient was hospitalized with signs of acute flaccid paralysis (AFP), which is one neurologic manifestation of WNV disease. AFP often presents as isolated limb paresis or paralysis.
- New cases of WNV continue to be reported in Orange County. A total of 29 symptomatic cases and 4 asymptomatic blood donors have been reported so far this season (chart at right).

West Nile Neuroinvasive	25
West Nile Fever	4
Asymptomatic	4
Total Infections	33

WNV Update – CA: There were 17 new WNV cases reported in California last week for a total 327 cases, including 11 fatalities (as of 10/14).

Clinical Description:

- The incubation period for WNV infection is usually 2 to 6 days after a bite from an infected mosquito. Clinical syndromes range from febrile illness to neuroinvasive disease, which typically manifests as meningitis, encephalitis, or acute flaccid paralysis. Initial symptoms include fever, headache, malaise, arthralgia, or myalgia, and/or a maculopapular rash and occasionally nausea, vomiting.
- Less than 1% of infected persons develop neuroinvasive disease. Persons 50 years and older and those who are immunocompromised have the highest risk of severe disease.

Clinical Diagnosis:

- **Testing for WNV should be performed on those patients with any of the following conditions:** encephalitis, aseptic meningitis, acute flaccid paralysis, atypical Guillain-Barré syndrome, transverse myelitis, or prolonged fever > 7 days.
- Testing for WNV should include serum WNV IgM and IgG, with CSF IgM for cases of neuroinvasive disease.
- Differential etiology of suspected WNV illness, include Herpes simplex virus, enteroviruses, and other arboviruses. WNV serology may cross react with other flaviviruses. Check for travel to flavivirus-endemic areas and obtain vaccination history.

□ **Educate your patients, staff, and family about WNV prevention!**

- Eliminate standing water on your property as this is where mosquitoes breed;
- Make sure that door and window screens are installed and in good condition;
- When outdoors, use an insect repellent with DEET, picaridin or oil of lemon eucalyptus;
- Avoid being outdoors during dusk and dawn and wear long pants and long sleeves when outdoors.
- For Recommendations for Protecting Outdoor Workers from West Nile Virus Exposure, see: <http://www.cdc.gov/niosh/docs/2005-155/>

- **Report all WNV infections.** All WNV infections are investigated by Public Health. Sites of potential exposure are shared with Orange County Mosquito and Vector Control District to reduce and/or eliminate potential mosquito breeding sites in areas at increased risk of transmission. **Report by phone (714-834-8180) or fax (714-834-8196) within one working day.**