
# County of San Mateo
# Report to the Board of Supervisors on West Nile Virus

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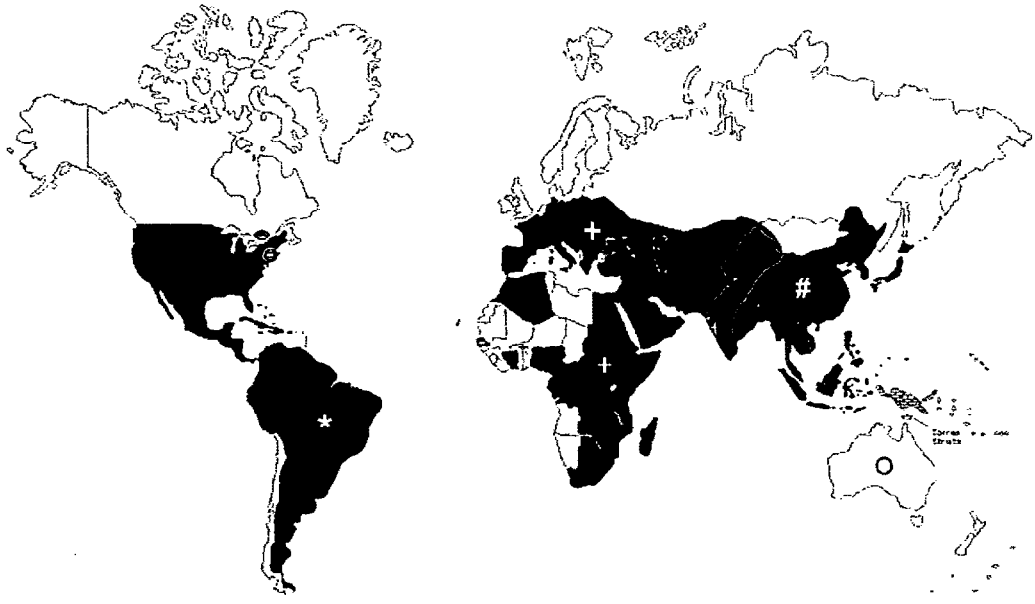
**West Nile Virus update for the San Mateo County Board of Supervisors**
**October 8, 2002**

## Background

West Nile Virus (WNV) was first isolated in the 1937 in the West Nile region of Uganda. WNV is spread by the bite of an infected mosquito and can infect humans, birds, mosquitoes, horses and some other mammals. There is no evidence to suggest that WNV can be spread directly from person to person or directly from animal to person.

The virus became recognized as a cause of severe human meningo-encephalitis (inflammation of the spinal cord and brain) in elderly patients during an outbreak in Israel in 1957. Recent outbreaks of WNV encephalitis in humans have occurred in Algeria in 1994, Romania in 1996-1997, the Czech Republic in 1997, the Democratic Republic of the Congo in 1998, Russia in 1999, the United States in 1999-2002, and Israel in 2000. There were epizootics of disease in horses in Morocco in 1996, Italy in 1998, the United States in 1999-2002, and France in 2000 and in birds in Israel in 1997-2001 and in the United States in 1999-2002. WNV is a flavivirus commonly found in Africa, West Asia, and the Middle East. It is closely related to St. Louis encephalitis virus found in the United States and Japanese encephalitis found mainly in Asia, and is considered a member of the Japanese encephalitis serocomplex. The following map shows the world distribution of this family of viruses (this map is out of date with regards to the spread of WNV in the United States).

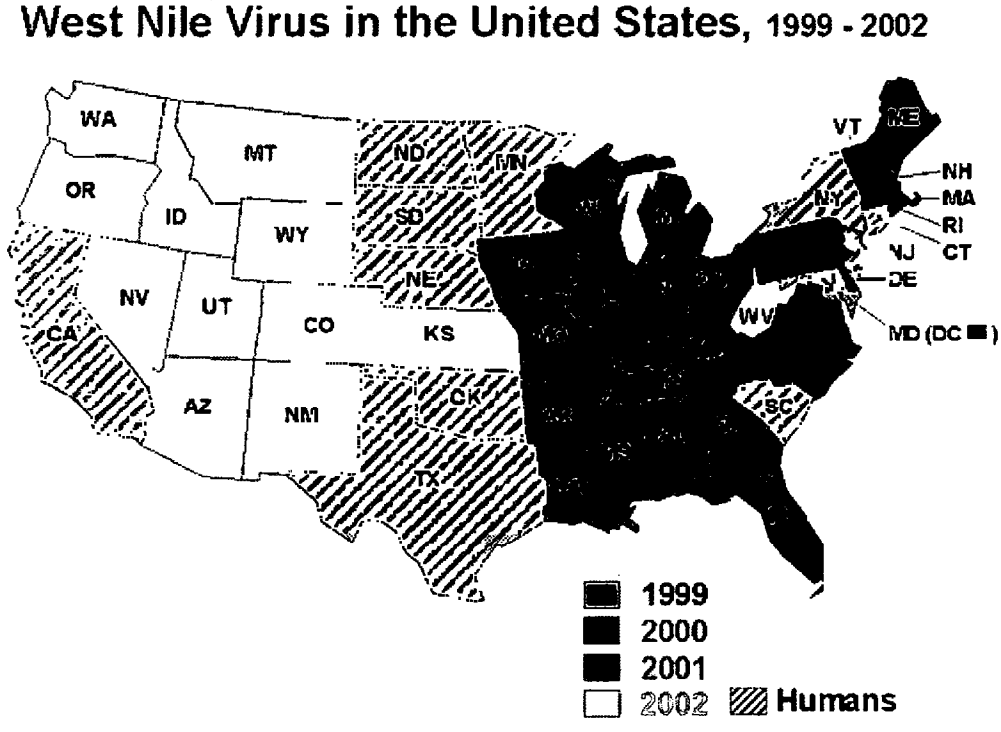
The Geographic Distribution of the Japanese Encephalitis Serocomplex of the Family Flaviridae, 2000.



- St. Louis encephalitis
- Rocio and St. Louis (Brazil)
- West Nile virus
- Japanese encephalitis
- West Nile and Japanese encephalitis
- Japanese and Murray Valley encephalitis
- Murray Valley and Kunjin

The first appearance of WNV in the Western Hemisphere was in 1999 in the New York City area, with widespread bird deaths and cases of encephalitis reported in humans and horses. From 1999 through 2001, there were 149 confirmed cases of WNV human illness in the United States, including 18 deaths. There has been substantially more WNV activity this year. As of the end of September, 2002 WNV activity had been documented in 44 states, the District of Columbia, Canada, and Mexico.

In the United States in the first 9 months of 2002, over 2000 human cases and 100 human deaths have been attributed to WNV infection. This large increase represents rapid spread of the virus throughout the Midwest. A similar spread had been noted in previous years with a related virus - St. Louis Encephalitis (SLE). Although one case of WNV in Los Angeles in August was documented, as of 09/16/02, no mosquito pools, birds, or horses have been documented with infection or disease in California. In summary, WNV has become the leading cause of human, horse, and bird arboviral encephalitis in the United States.




The continued and rapid expansion of WNV across the United States indicates that it is permanently established in the Western Hemisphere. In the temperate zone of the world, West Nile encephalitis cases occur primarily in the late summer or early fall. In the southern climates, such as what we experience here, where temperatures are milder, WNV can be transmitted year round.

**West Nile Fever**

Most people who are infected with WNV will not have any type of illness. The incubation time after initial infection is 3-14 days. It is estimated that less than 20% of the people who become infected will develop West Nile fever: mild symptoms, including fever, headache, and body aches, occasionally with a skin rash on the trunk of the body and swollen lymph glands. In

approximately 1 out of 150-200 cases (<1%), more severe disease in the form of either meningitis, encephalitis, or both may occur. Symptoms include headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis; and death has occurred in 3-15% of those with severe disease. All residents of areas where virus activity has been identified are at-risk of developing West Nile meningo-encephalitis; however, the likelihood of severe disease occurrence increases with increasing age. Persons over 60 years of age are considered at highest risk. It is likely that persons with immune system compromising conditions are also at higher risk.

Very recent investigation has also shown that WNV can be transmitted through organ transplantation. It is also likely that blood transfusion carries a small but not zero risk as well. The CDC is actively investigating this possibility and whether treatment of the blood products will inactivate the virus or whether a rapid screening test can be developed.

**Testing and Treatment**
Only physicians are capable of making a diagnosis of WNV in humans. If individuals are concerned, they should seek medical attention. Based on presenting symptoms, physicians will first take a medical history to assess for risk of WNV. People who live in or have traveled to areas where WNV activity has been identified are at some small risk of getting WNV-related disease – imported cases (people who were infected in endemic states and then traveled) have been reported in California, Washington, and Oregon. Persons older than 50 years of age have the highest risk of severe disease. If a person is determined to be at high-risk and have symptoms of West Nile encephalitis or meningitis, their provider has been instructed by public health to draw both blood and spinal fluid samples and send them to the state lab for analysis. At this point in time, there is no specific treatment for WNV-related diseases. In more severe cases, intensive supportive therapy is indicated, often involving hospitalization, intravenous fluids, airway management, respiratory support (ventilator), prevention of secondary infections (pneumonia, urinary tract, etc.), and good nursing care.

**Bird Information**
In the 1999 New York area epidemic, there was a large die-off of American crows. Since then, WNV has been identified in more than 110 species of birds, especially crows and jays, found dead in the United States. Most of these birds were identified through reporting of dead birds by the public. The California Department of Health Services (CDHS) has a toll-free number where members of the public can report dead birds. That number is (877) WNV-BIRD or (877) 968-2473. Dead birds in the County can be tested by calling this number or the San Mateo County Mosquito Abatement District (SMCMAD) at (650) 344-8592.

**Horse Information**
While data suggest that most horses infected with WNV recover, results of investigations indicate that WNV has caused deaths in horses in the United States. Horses become infected the same way humans become infected—by the bite of infectious mosquitoes. There have been over 5,000 cases of WNV in horses this year. A WNV vaccine for horses was recently approved, but its effectiveness is unknown.

**Other Animals**
WNV does not appear to cause serious illness in dogs or cats. A study conducted in New York

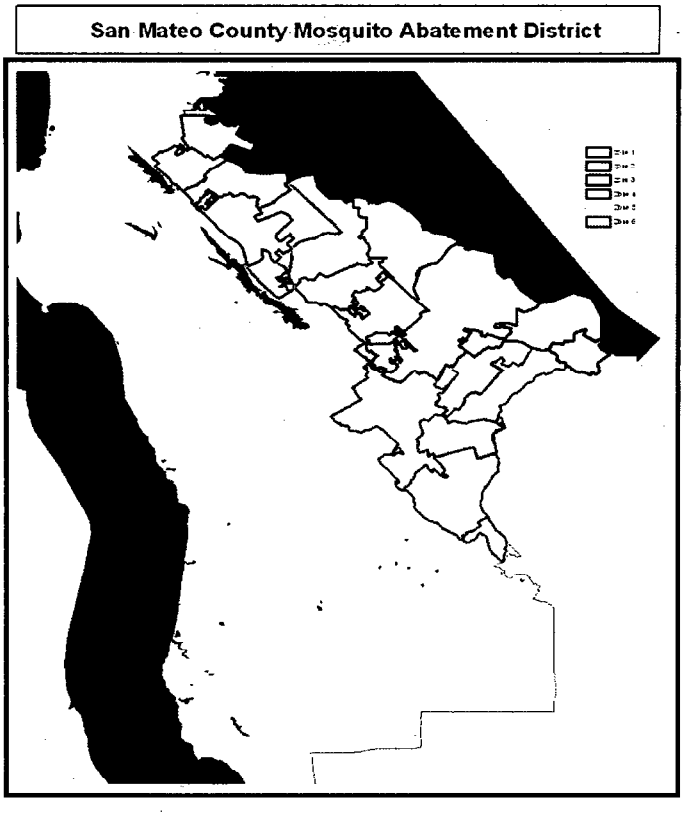
City in 1999 indicated that dogs do become infected with the virus, however disease from WNV infection in dogs has yet to be documented.

**Transmission and Prevention**
Currently, the most effective way to prevent transmission of WNV and other arboviruses to humans and other animals, or to control an epidemic once transmission has begun, is to reduce human exposure via mosquito control. The most effective and economical way to control mosquitoes is by larval source reduction. Experience suggests that this is best done through locally funded abatement programs that monitor mosquito populations and initiate control before disease transmission to humans and domestic animals occurs. Control of adult mosquito populations by aerial application of insecticides is usually reserved as a last resort. Individuals should also take personal action to reduce exposure to mosquitoes. (from 2001 CDC Revised Guidelines for WNV Surveillance, Prevention and Control).

**San Mateo County Public Health Division**
Extensive and on-going activities to notify local physicians, Emergency Rooms, and Hospitals of the risk of spread of WNV have been underway since early August, 2002. Local health care providers are required to notify Public Health when they have a suspect human case, after which samples of blood and spinal fluid will be sent to the state lab for analysis.

**San Mateo County Mosquito Abatement District (SMCMAD)**
The San Mateo County Mosquito Abatement District has a long-standing history of providing safe methods of mosquito suppression throughout the District's area of responsibility. County residents can call SMCMAD at (650) 344-8592 when they see increases in adult mosquitoes in their area. Staff will respond and investigate to discover whether new areas of mosquito breeding have developed.

SMCMAD performs a wide variety of protective functions but for the purposes of this report we will be focusing only on those related to mosquitoes and mosquito-borne diseases. It is also important to note that the District covers only those cities that have previously agreed to participate and small areas of unincorporated San Mateo County. **This leaves out north county, small areas of south county, and the coastside.** (see map for details).




*The area covered by the District is shown in yellow. Only 1/3 of the county's geographic area is covered by the District.*

The SMCMAD recently completed an updated Arbovirus Surveillance and Response Plan that includes WNV prevention and interdiction. It is attached to this report. This plan meshes smoothly with pre-existing abatement and surveillance activities and includes the following key areas:

1. Maintain existing collaborative activities with: local public health; CDHS vector-borne disease section, viral and rickettsial disease lab, and infectious disease branch; UC Davis Center for Vector-borne Research; UC Berkeley Arbovirus Research Unite, and the Centers for Disease Control and Prevention in Atlanta.
2. Continue aggressive prevention of adult mosquito population through use of focused larval suppression activities. These include mosquito-specific treatments, natural bacteria, fish that eat mosquito larvae, and surface oils on sources of standing water and stagnant underground water flow (as seen especially in Foster City and Redwood Shores).
3. Perform ongoing surveillance of adult mosquitoes throughout the District. This provides both monitoring of the mosquito population as well as supplying mosquitoes to CDHS to be tested for several different arboviruses (includes WNV). In situations where adult mosquito populations are increasing, supplementary control operations will be instituted.

4. Three sentinel chicken flocks are strategically placed around the District and are monitored serologically on a biweekly basis for development of antibodies to arboviruses.
5. Avian (dead bird) surveillance is already underway, and dead birds in good condition (without obvious decomposition or scavenging) are being submitted to CDHS for WNV testing. If a dead bird tests positive for WNV, mosquito collection and testing in the vicinity will be increased to provide increased surveillance and focused actions undertaken to reduce mosquito populations.
6. Human cases will be monitored through ongoing close relationships with the Health Officer and the Public Health Disease Control and Prevention Unit. Confirmed human cases will be investigated and SMCMAD will provide increased mosquito surveillance to areas that may have been a source of human infection.
7. Outreach and Public Education campaigns have already begun, and will be continued. As events warrant, increased outreach to the public on risk, spread, and personal protection will be performed.

**Recommendations**

While we probably can't prevent WNV from becoming permanently established in San Mateo County, we can take steps to reduce transmission to humans and animals.

1. **By far the most important thing that can be accomplished to reduce human and animal infections, and therefore reduce potential death from this disease, is to expand the boundaries of the SMCMAD to include the entire county.**
   Prevention and control of WNV and other arboviral diseases is most effectively accomplished through integrated vector management programs. These programs should include surveillance for WNV activity in mosquito vectors, birds, horses, other animals, and humans, and implementation of appropriate mosquito control measures to reduce mosquito populations when necessary. Additionally, when virus activity is detected in an area, residents should be alerted and advised to increase measures to reduce contact with mosquitoes. Specific surveillance steps should include: active bird surveillance, active mosquito surveillance, enhanced passive veterinary surveillance, and enhanced passive human surveillance.

2. **Develop a plan to increase distribution of educational material to the general public, schools, etc. about WNV and mosquito avoidance.**
   A critical component of any prevention and control program for vector-borne diseases is public education about these diseases, how they are transmitted and how to prevent or reduce risk of exposure. A specific plan to address this public educational need should be developed.

3. **The Public should take measures to limit their exposure to mosquitoes and avoid mosquito bites. If individuals are in an area with biting mosquitoes, they should follow these recommendations.**

   - Consider staying indoors at dawn, dusk, and in the early evening, which are peak mosquito biting times.
   - Make sure that doors and windows have tight fitting screens. Repair or replace screens that have tears or holes in them.
   - When possible, wear long-sleeved clothes and long pants treated with repellents containing permethrin or DEET (N,N-diethyl-meta-toluamide) since mosquitoes may bite through thin clothing.
   - Do not apply repellents containing permethrin directly to exposed skin. If you spray your clothing, there is no need to spray repellent containing DEET on the skin under your clothing.
   - Apply insect repellent containing DEET when outdoors.
   - Call the SMCMAD for assistance.

4. **Residents should take an active role in reducing mosquito breeding habitats.** All residents in the county can help reduce the chances of spreading WNV when it arrives. Everyone can help reduce the number of mosquitoes in outdoor areas where they work or play by draining sources of standing water. In this way, residents can reduce the number of places mosquitoes can lay their eggs and breed.

   - At least once or twice a week, empty water from flowerpots, pet food and water dishes, birdbaths, swimming pool covers, buckets, barrels, and cans.
   - Check for clogged rain gutters and clean them out.
   - Stock permanent ponds with fish that eat mosquito larvae.
   - Remove discarded tires, and other items that could collect water.
   - Be sure to check for containers or trash in places that may be hard to see, such as under bushes or under your home.
   - Call the SMCMAD for assistance.

5. **Initiate regular and systematic meeting and data sharing between SMCMAD and the Health Department.**

6. **SMCMAD and Public Health should work together to initiate regular communication to jurisdictions and the medical community about the success and/or failures of abatement programs.**