DOH WNV Surveillance, Prevention and Response

Objective: Continue implementation of effective surveillance, prevention, and control of West Nile Virus (WNV) in Hawaii.

The Department of Health (DOH) continued to maintain and improve its current surveillance and prevention efforts, and established greater capacity for responding if WNV was detected, in order to prevent the establishment of the virus in the state.

WNV poses a serious threat to Hawaii for several reasons. Given the tropical climate of the state, mosquito populations are present throughout the seasons, suggesting the potential for year-round transmission and prolonged human disease outbreak. Direct medical costs will be significant. With regards to wildlife, WNV will probably extinguish several endangered and endemic bird species in Hawaii, and may cause irreversible damage to the ecosystem. Additionally, Hawaii's economy is dependent on tourism, and its beautiful and safe environment is attractive to many visitors. Establishment of a mosquito-borne disease with no cure or prophylaxis currently available would have a negative impact on the state's economy.

The Department of Health focused its efforts in various areas:

1. Prevention activities continued to focus on source reduction, and source treatment with larvacides. Hawaii's mosquito species are container breeders, so reducing the number of water-collecting items from property reduces the breeding sites for the mosquitoes. Public outreach is critical for source reduction, and is discussed below. In addition, treatment of standing water with larvacides greatly enhances the reduction of the adult mosquito population, especially because standing water cannot be eliminated in many areas. Mosquito suppression is targeted so that if the virus is introduced, there will not be a sufficient mosquito population to establish the disease cycle.

2. Educating the public was another significant activity for prevention of WNV. The department shared WNV information through various venues, including health fairs, pet shows, neighborhood boards, association and group meetings, and the main public library. Other outreach activities included radio public service announcements, production and dissemination of informational brochures. Outreach efforts will continue with the first basic concept of informing the public of the need for mosquito control. DOH seeks HISC funds to maintain our level of effort. What did we actually do in FY09? Refer to later in report?

3. Source reduction. The department's Vector Control program continued to implement strategies of reducing mosquito populations to a level of no more than 5 mosquitoes per trap per night, with surveying for breeding sites triggered by higher counts. Maintaining low mosquito counts has proven more difficult in some areas than others. Surveillance of an approximate radius of two miles of all major ports of entry, to detect and reduce breeding sites continues. As a significant focus on prevention, DOH seeks HISC funds to

maintain our level of effort in the area of source reduction. Ports of entry, both air and sea, will continue to be the primary focus of DOH mosquito surveillance and reduction.

4. Dead bird surveillance is accomplished through a contract established with Aloha United Way to operate a public hotline, accessible statewide, to report dead birds. Due to cost and potential for test failure, the DOH discontinued the RAMP (Rapid Analyte Measurement Platform) test for screening mosquito pools in February 2009. Specimens were sent to the Hawaii State Laboratories Division (SLD) for real-time RT-PCR. Testing for antibody to WNV was an alternative to screen live birds for exposure to West Nile Virus, so DOH SLD maintained capabilities using Blocking ELISA and hoped to have developed methods on MicroImmunoAssay (MIA) but lacked resources.

5. Detection of WNV in a timely manner is critical in preventing the establishment of WNV or, if it is established, minimizing the public health impact in humans and animal species. Due to our relative remoteness, efforts have been made to ensure that a full menu of WNV testing is available within the state. Protocols for performing Enzyme-Linked Immunosorbent Assays (ELISA) for WNV antibody in humans were established at the State Laboratory Division (SLD), and will continue to be used for the diagnosis of WNV human infections. A more sensitive alternative to the ELISA was established in October 2008 by SLD. The MicroImmunoAssay (MIA) was established for human testing and could have been used for live bird testing had there been resources (see 4 above). The SLD is prepared to continue performing tests to detect WNV in human cerebral spinal fluid specimens, dead bird organs, and mosquito pools if funding is available for FY 2010, which appears unlikely. Without HISC or some other source of funding, the laboratory capabilities for West Nile Virus testing in dead birds, mosquito pools, and live birds will be eliminated by the end of 2009.

Department of Health – Measures of Effectiveness

Vector Control Branch

Goal: Enhance capacity to identify West Nile Virus (WNV) in mosquitoes and dead birds, prevent establishment of WNV by maintaining a state-wide integrated mosquito management (IMM) program, and maintain and provide resources for a ground-based response to WNV introduction.

Measures of Effectiveness:

Objective	Measure	Responsible
Maintain gravid traps at major ports of entry for collection of mosquitoes	Number of gravid traps at each port of entry	A total of 59 gravid traps are maintained on the 4 major islands. In addition, 122 New Jersey mosquito light traps monitor the *Culex* and *Aedes*

		vexans populations statewide.
Sort and pool mosquitoes for WNV testing	Number of mosquitoes sorted, number of mosquito pools submitted to SLD	174,373 mosquitoes were sorted. 4075 pools were submitted to SLD.
Necropsy dead birds for WNV testing	Number of dead bird necropsies with tissues submitted to SLD	127 birds were necropsied and submitted to SLD.
Identify sources of mosquito breeding within 2-mile radius of major ports of entry	Number of new mosquito breeding sites identified during surveys, total number of mosquito breeding sites	Oahu, Hawaii and Maui are conducting surveys within a 2-mile radius of ports of entry at the present time. All new breeding sites are documented, treated and added on to the routine list of treatment sites. Survey was last done in 2004.
Remove or eliminate sources of mosquito breeding	Number of mosquito breeding sites removed/ eliminated	This data is unavailable. Eliminated sites are not archived as to date of removal.
Treat (larvicide) mosquito breeding sources	Number of mosquito breeding sites treated	More than 1,000 mosquito breeding sites were treated.
Maintain database of mosquito trap data, and mosquito breeding sources (location, inspection, treatment)	Ongoing maintenance of database	Statewide maintenance of the Vector Control Management System (VCMS) database is ongoing.
Report mosquito trap results in a timely manner	Mosquito trap results are reported to appropriate personnel monthly.	Results were reported to appropriate personnel.

State Laboratories Division

Goal: Enhance laboratory capacity to identify West Nile Virus (WNV) in humans and other species (dead birds, equine, live birds mosquitoes).

Measures of Effectiveness:

Objective	**Measure**	**Jan to Aug 2008 data**	**Responsible**
Maintain real-time RT-PCR testing for avian samples and mosquitoes	Number of dead birds, mosquito pools tested for the year, statewide	**99** Dead birds **2097** Mosquito pools	SLD
Maintain Blocking ELISA test in support of live bird surveillance	Number of Blocking ELISA test performed	**1837**	SLD

Maintain Plaque Reduction Neutralization Test (PRNT) for the confirmation of West Nile Virus detection by ELISA or MIA	Number of Proficiency testing performed and passed. Number of PRNT testing performed to rule-out West Nile Virus (WNV).	**5** PT samples for IgG; **5** PT for IgM ; **10** PT for rti RT-PCR **10** PRNT PT tests **Passed All PT**	SLD
Validate the MicroImmunoAssay (MIA) test in support of live bird surveillance activities	Validation/verification studies for the MIA performed within the budget period	Not performed due to the loss of one HISC-funded Microbiologist. Pandemic A H1N1 outbreak	SLD
Establish MIA as part of the live bird surveillance testing algorithm	Number of MIA tests performed on live birds sera	Not accomplished due to the loss of one HISC-funded Microbiologist. Pandemic A H1N1 outbreak	SLD
Maintain database of all laboratory results (surveillance, diagnostic tests)	Submit monthly lab data and post this on the DOH website.	Database maintained and updated regularly; monthly lab data are posted on the DOH website.	SLD
Timely reporting of lab results.	90% of WNV Blocking ELISA results are reported to the submitters within 2 business days from the date suitable specimens are received in the Lab. 90% of WNV RT-PCR results are reported to the submitters within 4 business days from the date suitable specimens are received in the Lab.	Please see notes below	SLD

Turn-Around Time (TAT) for WNV RT-PCR : From January to August 2009

Desired TAT of 4 business days for testing mosquito pools and dead birds by rti RT-PCR was not met for the period Jan to Aug 2009. Of the total specimens tested, only 19% (411/2198) met the 4-day TAT.

Reason for not meeting the TAT:

The loss of the contract Microbiologist (contract ended on January 12, 2009) who performed the rti RT-PCR testing had a significant impact on the TAT. Further, the BRL was not able to hire a replacement Microbiologist because of lack of funds.

West Nile rti RT-PCR testing for mosquito pools was delayed due to increase in mosquito pool samples submitted by the Neighbor Islands. This resulted from elimination of the RAMP test on Neighbor Islands. Samples were directed to the SLD-BRL for rti RT-PCR testing.

TAT for WNV Blocking ELISA : From January to August 2008

Of the 1837 birds sera received for testing, 1791 (97%) met the 2-day TAT.

Reason for 3% not meeting the TAT typically was improper coordination for shipment of samples, which resulted in the delay in testing.

Outreach

Because of a reduced budget, no funds were used from 2009 for information development. Extra funds from 2008 were used to develop products for dissemination. In 2009, outreach participation was done at community fairs, the Pet Expo, and classroom presentations. HISC outreach staff on the neighbor islands helped to insure statewide coverage.

2009 funds were used to partially pay for the hotline number through Aloha United Way. Due to budget reductions at Aloha United Way, the 211 hotline reduced hours of operation from 24 hours a day to 7:00 am. To 9:00 p.m. on weekdays. The State Veterinarian from the Disease Outbreak Division was responsible for coordinating with AUW.

Measures of Effectiveness:

Objective	Measure	Accomplishment	Responsible
Produce informational items to give out at community events	Number of products distributed	2,500 fans with mosquito control information were distributed	EPO/HISC Public Outreach Working Group (POWG)
Hotline for dead bird pick-ups	Number of calls received at 211		DOCD
Develop outreach network for disseminating information	Number of community events statewide where WNV info was given out	Approximately 25 events where WNV information was disseminated by HISC and DOH staff	HISC POWG