

Minutes: Panel Discussion Sessions
West Nile Virus Prevention, Surveillance, and Control Workshop
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Vector-Borne Disease Section, California Department of Health Services

Panel: Dead Bird and Sentinel Chicken Surveillance

Stan Husted, Ryan Carney, Al Hom, Barbara Cahoon-Young, Jaime Pereira

- What can local agencies do to fight public apathy, and ensure the relevance and functionality of dead bird surveillance after the initial epidemic years?
Ryan Carney: Educate the public about the hotline, advertising early in the year, and emphasizing the importance of reporting (important for DYCAST) over testing.
- How are other avian diseases factored into the DYCAST model?
Ryan Carney: Background bird deaths do not really affect the model, since it is calibrated using the entire 2004 database and human case data. The sensitivity threshold has been adjusted to assume bird deaths from other diseases as part of background.
- Has tree squirrel testing for WNV been implemented in other parts of the country?
Stan Husted: At the 2004 National WNV Conference, there were discussions about the use of tree squirrels as early indicators of WNV activity, but the use in surveillance systems is still limited.
- What are the guidelines for public safety regarding tree squirrels and plague or other zoonoses?
Stan Husted: Information will be provided before the start of the next season.
- Will tree squirrel surveillance be emphasized over dead birds?
Stan Husted: No, it is a different reservoir. Ideally it will serve as a motivator for the public to call the WNV hotline and can complement the dead bird surveillance program.

Panel: Mosquito Surveillance

Bill Reisen, Barbara Cahoon-Young, Al Hom

- What is the baseline temperature for WNV transmission?
Bill Reisen: The threshold is 14.5 degrees C, the same as for SLE.
- At what temperature is transmission most efficient?

Bill Reisen: There is a logarithmic response to temperature. At low temperatures (in the beginning of the season), it took more than a month for virus to amplify. Above 24 degrees C the temperature is sufficient to promote rapid virus growth. When looking at levels of body titer, when the titer ≥ 5 , mosquitoes can transmit WNV, but can not with a titer < 4 .

- When using RAMP, how does one preserve the integrity of the sample?
Barbara: The existing commercial medium contains a harsh detergent that tends to denature the RNA. A basic viral transport medium is sufficient. This would consist of culture medium with extra serum and antibiotics. If standardization is in place, results will improve. Contact CVEC for a better medium and instructions for sample processing.
- Is there any difference in observed viremia between magpies and crows?
Bill Reisen: We know that scrub-jays that survived late in the year (about 2/3 of those sampled) showed high antibody levels, but we haven't done any testing yet of magpies, nor has Nick Komar. We'll be applying for a permit in the spring. Holly Ernst at the Wildlife Health Center has been looking at yellow-billed magpies.
- What was the evidence of vertical transmission in Kern County?
Bill Reisen: Female *Cx. quinquefasciatus* were collected in the field in Kern County and fed in the lab. First generation males from these females showed virus. In LA, mosquitoes were reared from females collected in gravid traps and the resulting males were positive. Since in the lab, the vertical transmission rate is 6/1000, it's a needle in a haystack situation, but we wanted field confirmation. It's the only other evidence of vertical transmission in the field other than from Kenya.
- Are your recommendations for RAMP processing and media being provided to the manufacturers?
Barbara Cahoon-Young: The manufacturers did not really address the issue of false positives that came up early in the season. They simply raised the cut-offs, increased the thresholds for positivity. I've been in contact with two of them about changing the package inserts. Agency input would be helpful here. The manufacturer's initial buffers also degraded the specimen and thus limited supplemental testing of specimen, and thus confirmation. It would be better to retain part of the original specimen and use aliquots for testing.

Panel: Equine Surveillance
Ben Sun, James Glover, Katie Wetherall

- Has there been any WNV testing on wild horses in the Mono Lake area?

Katie Wetherall: CDFA has only tested captured horses showing neurological symptoms. There is no ongoing surveillance of wild populations.

- In Alameda County, there was one incident when a horse was put down and there was no notification until two weeks later. Better communication with local vets is necessary.

Ben Sun: Communication with local vets is important, and we will encourage earlier notification. DHS/CDFA sent out a joint letter to vets encouraging reporting to the local health departments.

- What are the vaccination schedules with the new vaccines?

Katie Wetherall: The manufacturer guidelines recommend boosters once a year for both the Merial recombinant and the Ft. Dodge killed product. In areas of risk, two times a year is recommended. The UC Davis guidelines and the American Association of Equine Practitioners guidelines are twice a year to cover all of the transmission season.

- Does available data suggest which vaccine is most effective?

Katie Wetherall: State agencies can't recommend one over another. All have been studied for efficacy.

- After starting with the Ft. Dodge vaccine, can you switch to the Merial vaccine without repeating doses?

Katie Wetherall: Merial did a study that showed the efficacy of their product as a booster. There is no need to start over.

- Of the 19 horses that were vaccinated and got WNV, how many died?

Katie Wetherall: Seven.

Panel: Human Case Surveillance

Cynthia Jean, Anne Kjemtrup, Glennah Trochet

- What data is available on incubation period in humans? Can travel and exposure history be incorporated into the case history report?

Cynthia Jean: The exposure and travel history are included in the case history report. CDC guidelines give 2-14 days as the incubation period.

- Can IgG results be used to track future infections? Information from the local health department has given only IgG+ results. And, is there cross-reactivity with other viruses?

Chris Preas: We're looking into use of an avidity reagent with the PanBio kit to help sort out old vs. current infections. Some cross-reactivity does exist with dengue and yellow fever; there have been instances of IgG showing up due to previous yellow fever immunization.

Additional thoughts: Included in cross-reactivity is SLE. An IgG reactive serum, due to a previous flavivirus infection, can make sorting out a recent flavivirus infection difficult. DHS would request a convalescent phase serum, and then test the acute and convalescent sera as a pair. A 4 fold rise or C/A ratio ≥ 1.70 is diagnostic for a current Flavivirus infection. DHS would then use PRNT, which has the best specificity of all assays used, to ascertain which virus is associated with recent or current infection. We also look closely at travel history of the patient and age. Epidemiology also plays a crucial role in making sense of IgG detection without an accompanying IgM.

Barbara Cahoon-Young: While I was with a public health lab, we tested random samples, from sera being tested for other reasons, and found a high incidence of IgG positives samples which then did not show IgM. It's not a very helpful indicator without considering the rest of the clinical history.

- Is there any data on the impact on human health of abatement practices?
Glennah Trochet: It has not been addressed systematically. Sacramento Public Health did ask emergency rooms to report increases in respiratory illness-related ER visits on spray nights. No correlation was observed.
- Can data from blood donors be used to predict asymptomatic cases?
Anne Kjemtrup: Data from blood banks can't be used to predict the incident of asymptomatic cases for several reasons, but principally the source population (blood donors) does not reflect the general population because they don't all come from the same area (some are from different counties and thus different exposures) and those who donate tend to be healthier than the general population and it is unknown how that would affect estimates of incidence.
- Can you comment on the interpretation of IgG data?
Cynthia Jean: You have to rely on more specific testing and combinations of results.
Anne Kjemtrup: IgG and IgM results are evaluated in conjunction with looking at clinical symptoms.

Panel: Sacramento County WNV Response
David Brown, Glennah Trochet

- How are you dealing with the municipal government stakeholders when they are creating mosquito problems in your area?
Dave Brown: The catch basins of the combined sewer and street wastewater system are an ongoing problem. The local governments have cooperated in providing maps, etc., so that we can monitor and treat these.

- Are you working directly with the Board of Supervisors and City Councils?
 Dave Brown: SYMVCD made presentations to many of these in Jan/Feb/March of 2002, 2003, and 2004. Also, decision makers at those levels all have advisory boards. Nonetheless, 2 new members of the Board of Supervisors this year said, “We weren’t told anything” about control efforts. It is very important to emphasize the risk in a dramatic way to get the message across.
 Glennah Trochet: Many people did not think it was their problem.

- What is the political feasibility of enhanced adulticiding next year if surveillance indicates it is needed earlier in the season?
 Dave Brown: It appears now that we should have started adulticiding earlier, based on mosquito MIRs as opposed to human cases. But public response will complicate this. We may emphasize its necessity next year, scheduling Town Hall and information meetings before the season begins.
 Glennah Trochet: Adulticiding in other counties may have gone more smoothly as a result of what happened in Sacramento.

- What can you do to make this process easier next year?
 Dave Brown: We found that adulticiding is effective. This year we relied on larviciding and considered adulticiding a last resort. That didn’t work with the heavy rain that continued late into the year combined with record temperatures.

- What can you do to address the vocal opposition of the anti-spray-no-matter-what contingent?
 Dave Brown: Adulticiding is really the measure of last result, but it gets all the attention. We’ll enhance communication of our surveillance, larvaciding, and water control activities, explaining that they are part of an integrated pest management system. We’re hoping to add staff for these parts of the program. We will hold more town meetings, but there were complaints that town meetings aren’t enough. Some people cannot be satisfied.
 Glennah Trochet: We certainly won’t be making promises not to spray next year.

- How would you characterize the local media’s coverage?
 Glennah Trochet: Media thrives on crisis and confrontation. But the newspaper reporters who became educated were generally fair. Of course, most people watch TV rather than read newspapers.

Panel: WNV Response

John Stroh, Noor Tietze, Allan Inman, David Farley, Min-Lee Cheng, Branka Lothrop, Dave Brown, Vicki Kramer, Bill Reisen

- What would you do differently with the dead bird surveillance program?

John Stroh: I would not tell people midseason that we have stopped picking up dead birds. I would emphasize reporting to maintain consistency in the message.

- What criteria did you use to make mosquito control decisions?
John Stroh: 1) mosquito species found 2) time of year 3) activity near mosquito pools collected. We did include MIR and evidence of transmission but we did not make designations between urban, suburban, and rural.
- Are you using tree squirrels as part of the surveillance program?
Noor Tietze: Squirrels do not last as long as dead birds in the field, so we only responded if there was more than one in an area.
- When you flew over Merced, what altitude were you flying?
Allan Inman: We were flying at 200 ft. over residential neighborhoods, which is very challenging with limited light.
- What types of traps did you put out and did you use cages?
Dave Farley: We put out CO2 traps; about 10 traps per night.
- Is there an increased awareness since WNV has been around for a couple of years?
Min-Lee Cheng: Yes, people do remember but the district tries to re-educate the public each year as if there was no awareness.
- Are there any plans for efficacy trials comparing pyrenone droplet size?
Branka Lothrop: We used teflon pads to determine the number and density of drop size. Our understanding is that a larger droplet does not really improve penetration of vegetation. 40-60 microns is considered optimal. Some ground units apply in the 25-30 micron range, but there is poor penetration in urban areas and vegetation at this level. Levels of kill are good within 10-15 feet of output, but drop off quickly with increasing distance into vegetation.
John Stroh: Large commercial applicators outside of California have done a lot of characterization. Efficiency vs. cost (related to speed and altitude of flying to achieve certain droplet sizes) is an issue.
- Are there plans for barrier application in Coachella Valley?
Branka Lothrop: We find ground fogging to be useful prior to events at public parks, etc., but it's too time-consuming to be implemented on private properties. Barrier spraying, which leaves a residue for about three weeks, is effective for hot spots.
- What kind of solution do you use in gravid traps?
David Farley: We use 7-day Bermuda grass infusions.

- Since mosquitoes also feed on plant matter for carbohydrates, are there any treatments planned to exploit this?
 Bill Reisen: Barrier applications/residues are meant to address that.

- How can we interpret the variation in efficiency, county to county, of sentinel chickens as early indicators?
 Branka Lothrop: Positioning of flocks can be important. Our rural North Shore flocks were an early indicator, but the flocks in urban areas converted much later.
 Vicki Kramer: We still support the importance of flocks in surveillance. Their advantages include: they provide information on precise location of infection, give an ongoing temporal marker, indicate the intensity of activity based on the number or seroconversions per flock, and use few resources. They are also popular with the public and the media.
 Bill Reisen; Chickens are the only surveillance tool in which antibody levels are measured. With 2-week bleeding intervals, and the lag in antibody level rise, a delay is built in. The results are similar to what we've seen in wild bird sampling.

- Given these lags, should threshold/trigger values be lowered to adjust for them in signaling a response?
 Vicki Kramer: We tried to make the triggers relatively sensitive. Not all areas use all of the seven different factors. Hopefully weighing all of them gives a complete picture. The plan could be modified regionally depending on which triggers are important in each area.

- How about using sentinel crows?
 Bill Reisen: We don't want to provide mosquitoes a sentinel with high viremias because then the crows would serve to infect mosquitoes.
 Pigeons have been used as sentinels, but show highly variable viremias compared to chickens.

- Can sick squirrels, taken to wildlife centers, be used as surveillance tools?
 Kerry Padgett: Lindsey Wildlife Museum in Contra Costa County has submitted some sick squirrels. Sacramento County reported the greatest number of dead squirrels, around 84.

- If scrub-jay populations are depleted in Fresno County, what will be the next "bird of choice" there?
 David Farley: I don't know. Maybe we'll have to depend more on DYCAST.