Assessment of West Nile Virus Impact on Local Mosquito and Vector Control Agencies in California, 2004

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Introduction

West Nile virus (WNV) first appeared in the United States in 1999 in New York and rapidly spread to many regions of California in subsequent years. California has historically maintained a comprehensive mosquito-borne disease surveillance and control program. In anticipation of the arrival of WNV, the California Department of Health Services (DHS), in consultation with local mosquito and vector control agencies, developed a Mosquito-Borne Disease Surveillance and Response Plan. WNV first appeared in California in 2002 with the identification of one human case. In 2003, three human cases occurred in California and WNV activity was detected in six southern counties. By 2004, WNV activity was observed in all 58 counties in California and 830 human infections were identified.

In November 2004, DHS staff developed a questionnaire to assess the impact of WNV on local mosquito and vector control agencies (Appendix 1). Financial impact, use of surveillance data, mosquito control, and public education activities were included in this assessment. The questionnaire was sent by electronic mail to 58 county environmental health departments and 54 mosquito and vector control districts in California (referred to hereafter collectively as “agencies”). Agencies were requested to return the survey by email, mail, or FAX. Follow-up phone calls were made in December 2004 and January 2005 to agencies that have a mosquito and vector control program (as determined by membership in the Mosquito and Vector Control Association of California [MVCAC]).

Forty (74%) of fifty-four mosquito and vector control agencies responded to the questionnaire. Since most environmental health departments do not have a comprehensive mosquito control program, only seven (12%) of fifty-eight county environmental health departments responded. Not all questionnaires were completed fully by each agency. As a consequence, the following summary results are presented relative to the total number of responses for each question rather than the total number of agencies who returned the questionnaire.

Results were analyzed using Microsoft Excel. Nonparametric statistical tests Kruskal-Wallis one way ANOVA and Mann-Whitney U comparisons) were performed using the "Statistics Tool Box" available at: http://department.obg.cuhk.edu.hk/index.asp.

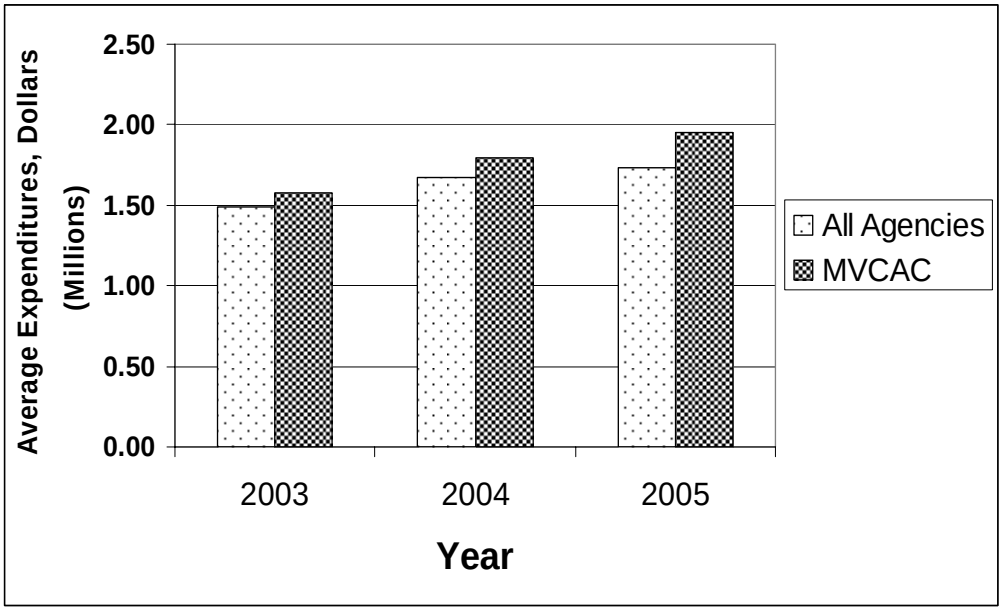
Local Preparedness

Forty (85%) of 47 agencies surveyed had a WNV task force in their county. Members of the task force included local health departments (98%), local offices of emergency services (78%), mosquito and vector control agencies (95%), local environmental health departments (98%), agricultural commissioner's offices (70%) and other agencies (53%).

Fiscal Impact

Agency budget was considered to reflect actual expenditures. Total numbers were divided by the number of responding agencies to compare the average total dollars spent between 2003 and 2004 and projected for 2005 (Figure 1). Agencies belonging to the MVCAC are shown separately because their primary responsibility is to conduct surveillance and control of vector-borne diseases, whereas "all agencies" includes both environmental health departments and MVCAC agencies. Between 2003 and 2004, MVCAC agencies increased the average expenditures 14.2% and spending was projected to increase an additional 8.8% in 2005 from 2004.

Figure 1: Average Local Agency Expenditures
2003 - 2005



Specific categories for MVCAC agencies were evaluated separately: personnel, operating, surveillance, and public education. From 2003 -2005 estimates, the percentage of the total budget spent in each category remained the same (personnel – 60%, operating – 37%, surveillance – 3%) except for public education which doubled from 1.3% in 2003 to 2.3% in 2004 and 2005. All categories increased in actual spending, as shown in figure 2 and table 1.

Figure 2: Average Expenditure by Category, MVCAC Agencies

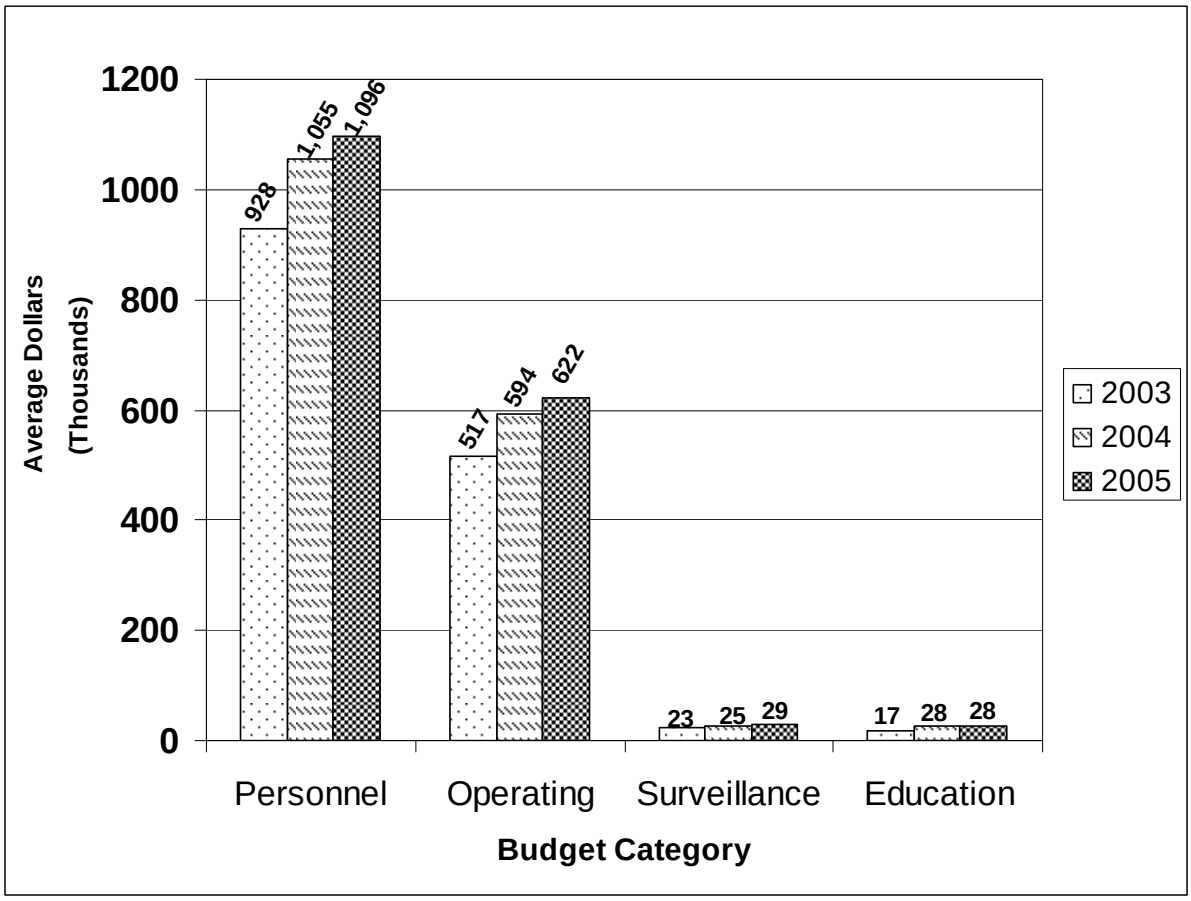


Table 1: Percent Increase of Average Dollars Spent in Specific Categories

Budget Category	% Increase 2003 -2004	% Increase 2004 – 2005	Total % Increase 2003 -2005
Personnel	13.7	3.9	18.1
Operating	14.9	4.7	20.3
Surveillance	8.1	13.7	22.9
Education	64.6	0.35	65.1

Twenty-two (50%) of 44 agencies responded that they did not have adequate funding in 2004 to respond to WNV. The program areas where the majority of agencies said they would have liked to increase if additional funds were available were public education (31/44 or 71%), adult mosquito surveillance (27/44 or 61%), and larviciding activities (26/44 or 59%). Thirteen (30%) of 44 agencies indicated that they would have increased adulticide activities if additional funds were available. Eighteen (39%) of 46 agencies reported that they are seeking additional revenues for 2005. Nine (19%) of 47 agencies are in the process of increasing their jurisdictional boundaries. Twenty-one (46%) of 46 agencies surveyed performed mosquito control activities outside of their agency's jurisdiction in 2004.

Mosquito and vector control agencies employed an average of 16.0 (range = 1-56) full time staff and 7.6 (range = 1-50) seasonal staff. Thirty-three (70%) of 47 agencies increased staffing in 2004 relative to 2003. On average, 0.44 (range: 0-8) professional staff, 0.19 (range: 0-1) administrative staff, 1.03 (range: 0-8) vector control technicians, and 4.05 (range: 0-40) seasonal staff per agency were hired. If additional funds were available, 26 (62%) of 42 agencies would have increased the length of employment for seasonal staff by an average of 3.62 months.

Surveillance

The objectives of WNV surveillance are to detect presence of the virus as early in the season as possible, monitor geographic spread of the virus, and monitor on-going transmission. There are several elements used to accomplish these objectives, including testing of mosquitoes for WNV and other arboviruses, monitoring sentinel chicken flocks for seroconversion to WNV and other arboviruses, and monitoring human and equine cases. Dead bird surveillance was an important component for early detection of WNV in 2004. Information from all these elements is incorporated in a semi-quantitative risk assessment model in the California Mosquito-Borne Disease Surveillance and Response Plan. The plan assists agencies in approximating the risk of virus transmission to humans and recommends response activities that correspond with the level of risk. This plan provides guidelines on response actions given transmission risk. Questions on surveillance were asked to determine how the surveillance elements were implemented in 2004 and how agencies are planning to perform surveillance in 2005.

Twenty-six (59%) of 44 agencies reported using the California Mosquito-Borne Virus Surveillance and Response Plan to guide WNV response activities in 2004.

Forty-one (87%) of 47 agencies maintained sentinel chicken flocks in 2004. If additional funds were available, 20 (43%) of these agencies would increase the number of sentinel chicken flocks in their district.

Thirty-five (74%) of 47 agencies collected mosquito pools for testing in 2004. If additional funds were available, 27/44 (61%) agencies would increase adult mosquito surveillance.

In 2004, 47 (100%) of 47 agencies participated in the dead bird surveillance program, of which 22 (47%) had a -70°C freezer in which to store carcasses. If additional funds were available, eight (18%) of 44 agencies would increase dead bird surveillance.

Thirty-six (77%) of 47 agencies planned to continue some surveillance activities during the 2004 "off season" (November – April). Thirty-one (86%) planned to submit dead birds, 15 (42%) planned to submit chicken sera, and 11 (31%) planned to submit adult mosquito pools.

Agencies reported receiving notification of positive test results from DHS via email (47 of 47, 100%), from the DHS website (27 of 47, 57%), and via telephone (41 of 47, 87%). Forty-two (89%) agencies preferred email notification, however comments indicated that a phone call for the first positive test result in an area would be appreciated.

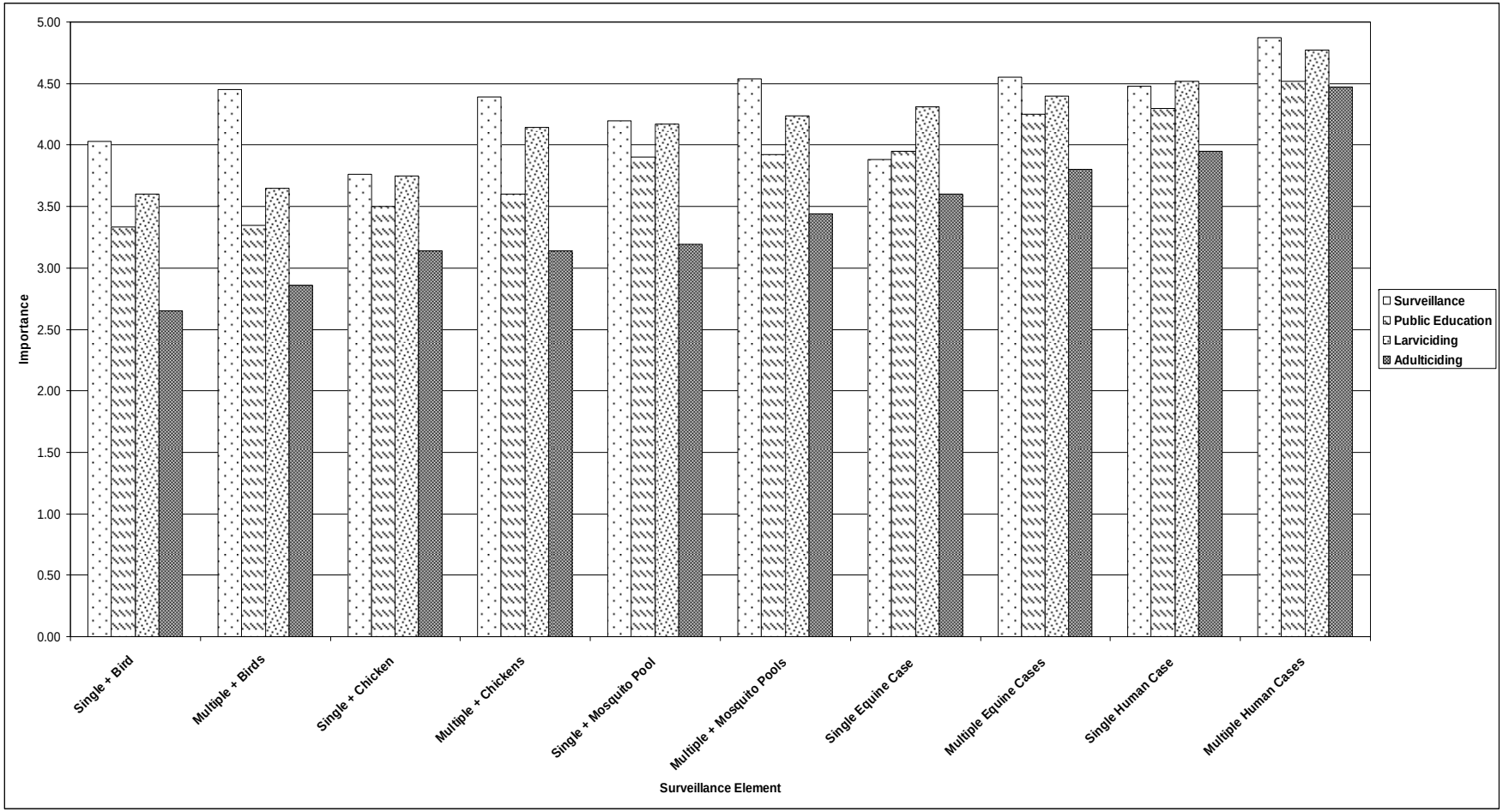
Thirty-six (77%) of 47 agencies participated in conference calls conducted in August and September, 2004. Thirty-four of these agencies stated that they would like to see the calls resume in the 2005 season.

Local Agency Response to Surveillance Data

Agencies were asked to weigh on a scale of 1 to 5 (1 least important, 5 most important) the importance of surveillance data toward initiating a prevention activity (e.g. larvicide application, adulticide application, educational activities, additional surveillance). The specific surveillance data considered were a single positive dead bird, multiple positive dead birds in one zip code, a single chicken seroconversion, multiple chicken seroconversions, a single positive mosquito pool, multiple positive mosquito pools, a single equine case, multiple equine cases, a single human case, and multiple human cases.

Figure 3 shows the average importance given by local agencies to surveillance data relative to the initiation of larviciding, adulticiding, educational activities, and additional surveillance. Multiple human cases was significantly more likely than a single dead bird to initiate larviciding ($p=0.0023$), adulticiding ($p=0.004$), and educational activities ($p=0.003$). There were no other significant differences between the types of surveillance data relative to specific initiation of any prevention activity.

Figure 3: Average Importance Given to Surveillance Data Relative to the Initiation of Larviciding, Adulticiding, Educational Activities, and Additional Surveillance



Testing

Dead bird testing for WNV was an important surveillance component for early detection of WNV in 2004. Some agencies tested corvids for WNV using commercial "VecTest" or "RAMP" tests; most birds were tested by RT-PCR at the University of California, Davis, Center for Vectorborne Diseases (CVEC). Questions on in-house testing were asked to determine if training in these tests should be offered, and to help assess how this information may be incorporated into the dead bird surveillance program.

Table 2: Local Agency Use of VecTest and RAMP*

	VecTest	**RAMP**
Number of agencies using test in 2004	15/46 (30%)	12/46 (26%)
Number of agencies that will continue using test in 2005	9/14 (64%)	10/12 (83%)
Number of agencies planning to initiate test in 2005	6/31 (19%)	3/33 (9%)

Table 3: Factors contributing to the decision not to initiate testing in 2005

	VecTest	**RAMP**
Cost too great	15/25 (60%)	23/30 (77%)
Efficacy	9/25 (36%)	8/30 (27%)
Efficiency	6/25 (24%)	6/30 (20%)
Other	8/25 (32%)	7/30 (23%)

*Not all agencies responded to each question, hence results are presented based on the actual number of responses to each question.

If federal funding were no longer available, 20 (43%) of 47 agencies would be willing to pay for VecTest. If federal funds were no longer available, 13 (28%) of 47 agencies would be willing to pay for testing via RT-PCR.

Adult Mosquito Control

Agencies were asked if they applied adulticides and the methods they used during the height of the WNV season (or in August if they were not severely affected by WNV in 2003 or 2004). Agencies were also asked to estimate the frequency with which they applied adulticides in 2003 and 2004 during the height of the WNV season or in August.

The number of agencies in each region that applied adulticides during the height of the WNV season (or in August) did not change significantly between 2003 and 2004 (Table 4). The increase in percentage of agencies applying adulticides via both ground and air was due principally to two agencies in the South San Joaquin Valley and Southern California that added aerial spraying to their ground application program.

Table 4: Adulticide Application*

	2003	2004	Percent change**
Applied adulticide	30/46 (65%)	32/46 (70%)	+ 7.7%
Application via ground	20/30 (67%)	19/30 (63%)	-5.9%
Application via ground & air	10/30 (33%)	11/30 (37%)	+12.1%

*Not all agencies responded to each question, hence results are presented based on the actual number of responses to each question.
** Change in adulticide application is not statistically different between 2003 and 2004 (p>0.01)

The frequency of adulticide application increased slightly, but the increase was not statistically significant in 2004 (Table 5). One to two agencies each in the Coastal and Sacramento Valley regions shifted from a one time per week to a two to three times per week application. One agency in The Northern San Joaquin Valley shifted from 1-3 times per month to 2-3 times per week. In the Southern San Joaquin Valley, two agencies went from 1-3 per month to a weekly schedule. In Southern California, a greater percentage of agencies reported weekly applications (2-3 or 1 time per week) in 2004 than in 2003.

Table 5: Frequency of Adulticide Application*

	2003	2004
Daily (all agencies by region)	**4/29 (14%)**	**3/31 (10%)**
Coastal	0/5 (0%)	0/5 (0%)
Sacramento Valley	1/6 (17%)	1/6 (17%)
North San Joaquin Valley	1/4 (25%)	1/4 (25%)
South San Joaquin Valley	0/7 (0%)	0/7 (0%)
Southern California	2/7 (29%)	1/9 (11%)
2-3 times per week (all agencies by region)	**6/29 (21%)**	**12/31 (39%)**
Coastal	0/5 (0%)	1/5 (20%)
Sacramento Valley	2/6 (33%)	4/6 (67%)
North San Joaquin Valley	2/4 (50%)	3/4 (75%)
South San Joaquin Valley	1/7 (14%)	2/7 (29%)
Southern California	1/7 (14%)	2/9 (22%)
1 time per week ((all agencies by region)	**5/29 (17%)**	**5/31 (16%)**
Coastal	1/5 (20%)	0/5 (0%)
Sacramento Valley	2/6 (33%)	0/6 (0%)
North San Joaquin Valley	0/4 (0%)	0/4 (0%)
South San Joaquin Valley	1/7 (14%)	2/7 (29%)
Southern California	1/7 (14%)	3/9 (33%)
1-3 times per month (all agencies by region)	**14/29 (48%)**	**11/31 (35%)**
Coastal	4/5 (80%)	4/5 (80%)
Sacramento Valley	1/6 (17%)	1/6 (17%)
North San Joaquin Valley	1/4 (25%)	0/4 (0%)
South San Joaquin Valley	5/7 (71%)	3/7 (43%)
Southern California	3/7 (43%)	3/9 (33%)

* Change in frequency of adulticide application is not statistically different between 2003 and 2004 (p>0.01).

The public was informed of adulticide applications via press release (16/29, 55%), newspaper notices (9/29, 31%), neighborhood postings (8/29, 28%), door tags (5/29, 17%), press conferences (5/29, 17%) and other methods, such as radio public service announcements and newspaper inserts (19/29, 66%). Only two (6.3%) of the 32 agencies that used adulticides in 2003 or 2004 did not notify the public about adulticide applications. Twenty-four (75%) of 32 agencies perceived that adulticide applications were received favorably by the public.

Website

DHS maintains a website on West Nile virus (www.westnile.ca.gov) that provides information to the public, press, public agencies, and others. Agencies were asked about how the website was used, awareness of the website, and utility of the website to identify changes that may be useful to the website in future years.

Forty-two (89%) of 47 agencies visited the CA WNV website in 2004. Twelve (29%) of 41 agencies used the website as a means of confirming specimen test results. Thirty-eight (93%) of 41 agencies referred to the website for bird identification, information and educational materials. Thirty three (85%) of 39 agencies referred the public to the website as a reference tool.

Agencies were asked to assess the level of awareness (unaware, somewhat aware, aware, very aware, extremely aware) of the website among residents of their constituency. Three (8%) of 40 reported that the public was unaware, 26/40 (65%), indicated that the public was somewhat aware, 8/40 (20%) reported that the public was aware, 2/40 (5%) agencies reported that the public was very aware, and 1/40 (3%) reported that the public was extremely aware of the website.

Figures 4 and 5 illustrate how often agencies visited the website and what links were used most often by agencies.

Figure 4: Frequency of Local Agencies Visiting CA WNV Website

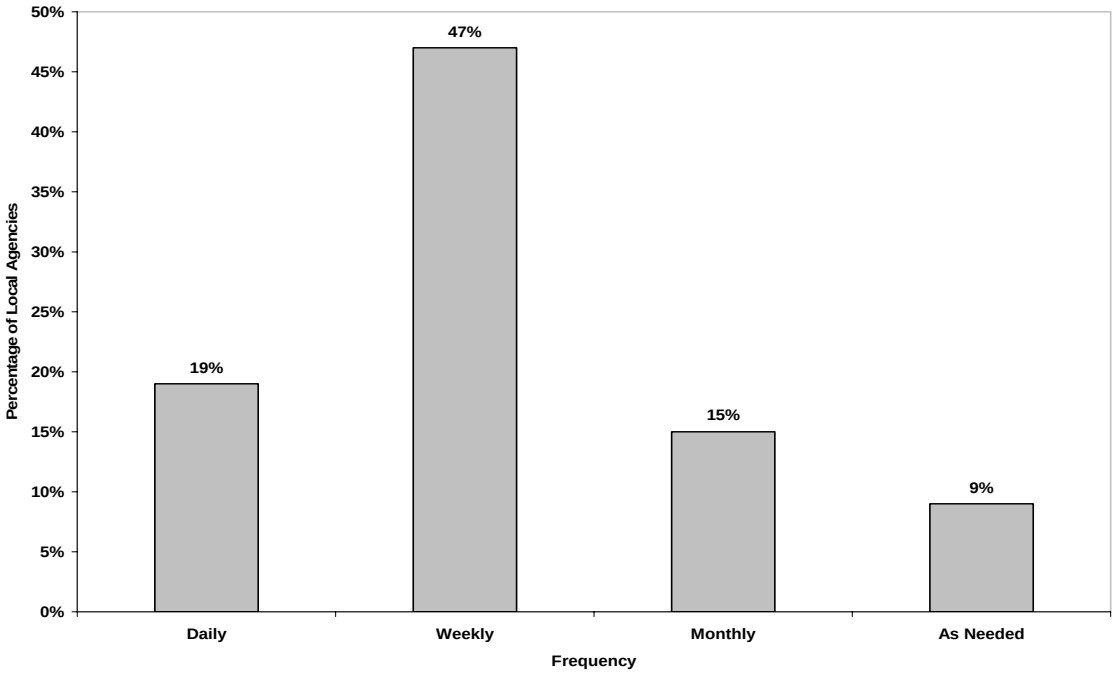
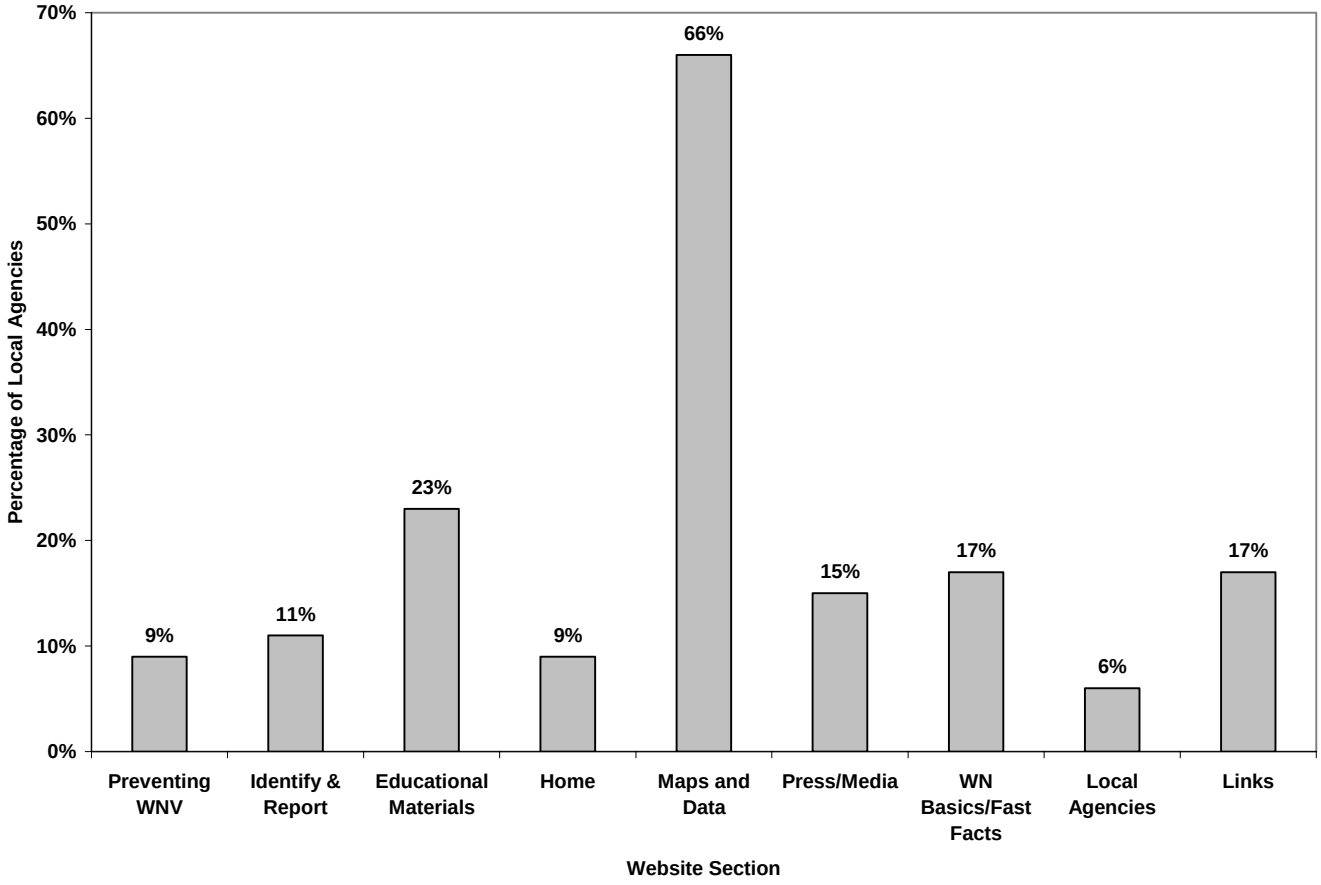


Figure 5: Sections of CA WNV Website Most Frequently Used by Local Agencies



Education

A very important part of WNV disease prevention is to increase public awareness of the presence of the virus and inform them of what they can do to protect themselves from infection. DHS produced a "Fight the Bite" public health educational campaign that many local agencies used. DHS also maintained a "hotline" that offered similar information and also allowed the reporting of dead birds. In addition, several agencies produced their own materials and implemented educational activities in a variety of ways. The methods and triggers of educational activities were assessed in this questionnaire to help evaluate the usefulness of DHS's program and offer information on successful programs used by local agencies.

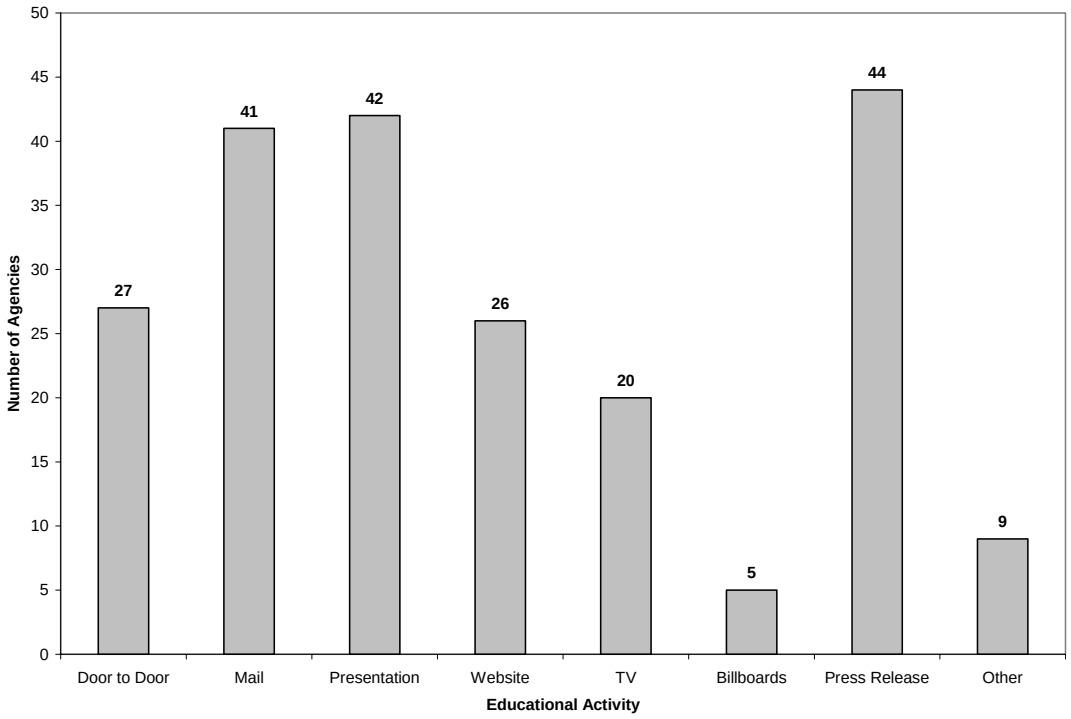
Forty-four (94%) of 47 agencies indicated use of educational activities. In 2004, 27 (57%) of 47 agencies used "Fight the Bite" materials. If additional resources were available, 31/44 (70%) of agencies would increase educational activities. Regardless of the materials used, in general, over 95% contained personal protection tips and included the WNV hotline phone number. Personal protection tips were not included in

25 percent of the bill boards, and 15 percent of the television advertisements did not include the WNV hotline phone number.

The public's awareness of the WNV hotline was evaluated by asking agencies to rate their perception of the public's awareness of the hotline on a scale of 1 to 5, 1 being not aware and 5 being very aware. On average, local agencies perceived the public's awareness of the WNV hotline as 2.94.

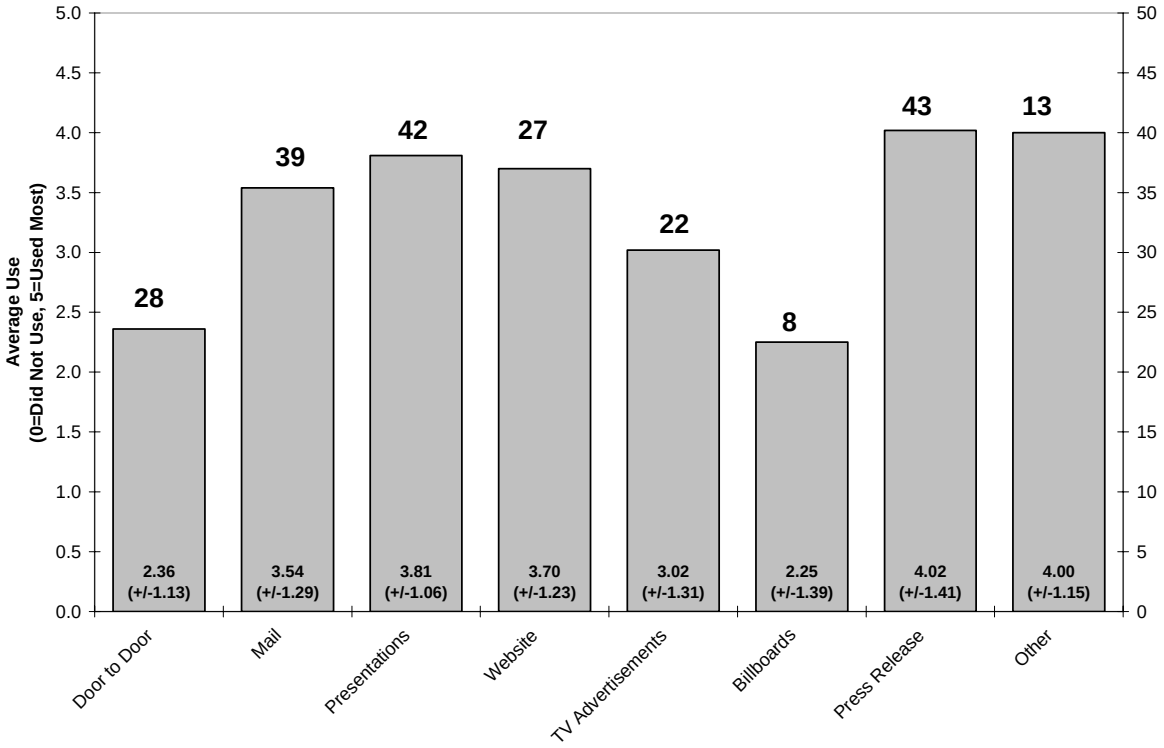
Press releases, postal delivery, and community education presentations were the most frequently used methods of public education (Figure 6). Agencies were asked their level of reliance on specified educational activities, on a scale of 0 -5 (0 = not used – 5 = used heavily) to get information out on WNV.

Figure 6: Educational Activities Used by Local Agencies



Press releases were the information medium most frequently used by 43 agencies. In contrast, only 8 agencies used billboards and these agencies used them moderately (2.25 +/-1.39). The "Other" category included advertisements on buses, cable television, and newspapers. Only 13 agencies reported using other activities, although on average they used them frequently (4.00 +/-1.15). Figure 7 shows the average reliance agencies placed on educational activities.

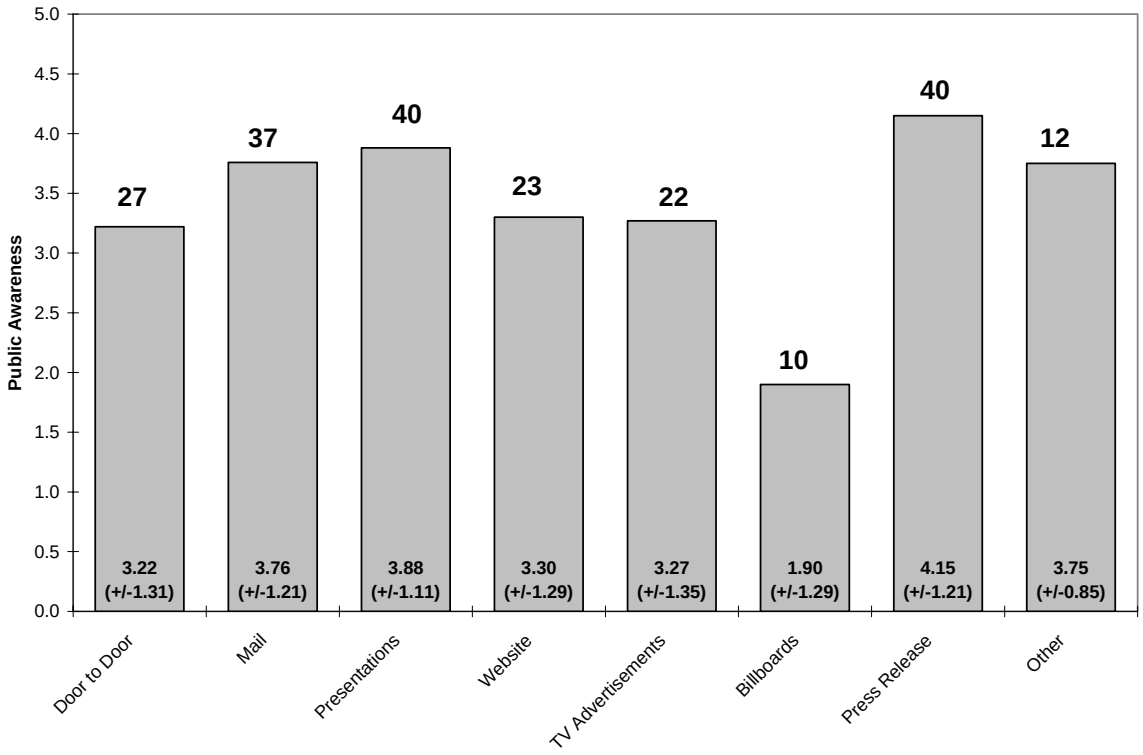
Figure 7: Local Agency Use of Specific Educational Activities*



* Number above the bar indicates the number of responding agencies that used the specified education activity.

Agencies were asked to rate the efficacy of specific educational activities to increase public awareness of WNV on a scale of 1-5 (1 = least effective, 5 = most effective). Press releases, postal delivery, and community education presentations were rated as highly effective. Figure 8 displays the frequency of use and perceived effectiveness of specified educational activities to inform the public about WNV.

Figure 8: **Local Agency Perception of Educational Activity Efficacy in Increasing Public Awareness***



* Number above the bar indicates the number of responding agencies that used the specified education activity.

Agencies were asked to rate each surveillance component (+ dead bird, + chicken, + mosquito, + horse, + human) as a trigger for performing a specific educational activity, based on a scale of 1-5, (1 = least important, 5 = most important). For example, was the occurrence of a local human case of WNV more likely to trigger a door-to-door response than the occurrence of a local positive mosquito pool? No one surveillance component was considered more likely to trigger a specific educational activity ($p > 0.01$ for all educational activities), however, a positive dead bird was more likely to trigger a press release than door-to-door information distribution ($p = 0.004$).

Discussion

Only half of the responding agencies felt that they had adequate funding in 2004 to address the impact of WNV in their jurisdictional boundaries. All aspects of mosquito control were impacted by WNV. Increases were seen in staff levels, adulticiding and larviciding activities, surveillance and public education. Public education saw the greatest increase in average expenditure among MVCAC agencies (65% increase from 2003 to 2004). Some comments offered from respondents suggested that additional funding for surveillance and public education in particular would have helped to expand

these programs to a more effective level.

Most agencies would have increased chicken and mosquito surveillance efforts if funding were available; however, only 18% of agencies indicated that they would increase the amount of dead bird surveillance. A similar number of agencies (6/31 or 19%) said they would initiate in-house Vec-Test and a smaller number (3/33 or 9%) said they would initiate RAMP testing of dead birds. This situation may derive from comments offered by some agencies requesting that dead bird test results be conveyed more quickly. Thus some agencies may feel that in-house testing will afford quicker results. As dead bird surveillance is a relatively new method for arboviral surveillance (Eidson, M. et al., 2001), local agencies are using the tool in different ways, some for early detection only and others for early detection and continued monitoring of virus transmission. DHS continues to refine the dead bird surveillance program to respond to agency needs, including providing Vec Test kits and training to local agencies, providing on-line dead bird reporting, and changing zip code areas, at the agencies' request, where dead birds will be picked up (Husted, S. et al., 2005). Information from this survey and from ongoing studies in California will help refine both the surveillance program and the Mosquito-Borne Disease Surveillance and Response Plan.

The change in method of adulticide application reported by agencies did not change significantly between 2003 and 2004 even in regions hit heavily by WNV in 2004, such as southern California. There was a slight (though not statistically significant) increase in the frequency of adulticide application, principally due to agencies in northern California shifting from a once-a-week to a 2-3 times per week application and agencies in Southern California shifting from a monthly application to a weekly application schedule. Unfortunately, questions about the amount and frequency of larvicide application were not asked directly, though the majority of agencies (59%) reported that if more funds were available, they would have increased their larvicide activities. This likely reflects that, in general, most mosquito control in California targets the larval stage of mosquitoes ("larviciding") (Reeves, W. C., 1990).

The majority of agencies visited the CA WNV website in 2004. Interestingly, one of the least used sections of the site in 2004 was the "Local Agencies" tab. It may be that the label "Local Agencies" was not recognized as a tab for local agencies to access data. Changes to the website will continue in 2005. As real-time reporting and detailed maps become available online in 2005, use of the website may increase. Early reports in 2005 indicate about 4,000 "hits" daily to the website.

Local agencies frequently issued press releases as a low-cost means of informing a large audience. Direct mail information and community presentations were ranked as the next most used and effective outreach methods, followed by television and website announcements. Almost all forms of educational activities were reported to contain personal protection messages and the WNV hotline phone number. It did not appear that one type of surveillance information triggered a specific educational activity. The question however, did not really address the timing of educational activities and it may

be that a positive dead bird was just as likely to generate a press release as a human case, simply because it was the first indication of WNV activity and it was deemed that people should be made aware at the first sign of virus activity. In 2005, DHS is planning to tailor press releases to emphasize important points at particular times during the season.

Acknowledgements

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West Nile Virus Surveillance Information and Economic Impact Questionnaire

To evaluate and improve our surveillance program for the coming year, the California Department of Health Services, Vector-Borne Disease Section (VBDS), is conducting a statewide survey to assess the use of West Nile virus (WNV) surveillance information (dead bird testing, adult mosquito testing, sentinel chicken testing) and the economic impact of WNV. Results of this survey will assist us in planning for the 2005 season. Please take the time to complete the following survey and **fax to (510) 412-6263** (VBDS Richmond) **by November 19, 2004.** If you have questions regarding the survey please contact Jasmine Mohiuddin at (510) 412-6298, jmohiudd@dhs.ca.gov, or Stan Husted at (510) 412-6253, shusted@dhs.ca.gov. Each questionnaire will remain confidential. Summary results from the survey will be distributed to interested local, state, and federal agencies.

Agency Information

1) Agency name: _____
   Address: _____
   County(s) served: _____
   Phone number: _____ Fax number: _____

   Name of respondent: _____
   Phone number: _____
   Email: _____

In 2004:

2) How many people does your agency serve? _____

3) How many full-time staff does your agency employ? _____

4) How many seasonal staff does your agency employ? _____

5) Approximately how many square miles does your agency cover? _____

6) Approximately what percentage of the county does your agency cover? _____

7) How many mosquito control agencies are in your county? _____

8) Does your county have a WNV Task Force? ☐ Yes ☐ No
   a) If yes, which of the following public agencies participate? (check all that apply)
      ☐ Local Health Department
      ☐ Environmental Health Department
      ☐ Local Office of Emergency Services
      ☐ Agricultural Commissioner's Office
      ☐ Mosquito and Vector Control Agencies
      ☐ Other _____

Financial Impact

9) Please approximate your yearly budget in the following categories: (If you operate on a fiscal year rather than calendar year, change to FY 2002/2003, 2003/2004, 2004/2005)

	2003	2004	2005
Personnel			
Operating/Other			
Surveillance			
Public Education			
Total			

10) Approximately what percentage of your budget is used for larviciding? _____

11) Approximately what percentage of your budget is used for adulticiding? _____

12) Does your agency have reserve funding? ☐ Yes ☐ No
   a) If yes, how much? $_____
   b) If yes, did your agency need to use reserve funding to respond to WNV in 2004? ☐ Yes ☐ No
      i) If yes, how much? $_____

13) Is your agency in the process of seeking additional revenues? ☐ Yes ☐ No
   (e.g. through an increase in assessment fees or other means.)

14) Is your agency in the process of expanding its current jurisdictional boundaries? ☐ Yes ☐ No

15) Did you increase staffing in 2004 relative to 2003? ☐ Yes ☐ No
   a) If yes, by how many:
      _____ # of professional staff
      _____ # of administrative staff
      _____ # of vector control technicians
      _____ # of seasonal staff

16) If you employed seasonal staff, would you have lengthened their employment period to enhance WNV surveillance and control if additional resources were available? ☐ Yes ☐ No
   a) If yes, by how many months? _____

17) Did you feel your funding was adequate this year to respond to WNV? ☐ Yes ☐ No

18) If additional resources were available, which activities would you have increased?
   ☐ Adulticiding ☐ Dead Bird Surveillance ☐ Other _____
   ☐ Larviciding ☐ Sentinel Chicken Surveillance
   ☐ Public Education ☐ Adult Mosquito Pool Testing

19) If WNV activity increases in your agency's jurisdiction in 2005 relative to 2004, do you feel you have adequate funding to respond fully? ☐ Yes ☐ No
   a) If no, how much of an increase in funding would you require to respond fully? $_____

Surveillance Activities

20) Does your agency maintain sentinel chicken flocks? ☐ Yes ☐ No
   a) If yes, how many flocks? _____
   b) If yes, how many flocks are located in urban areas? _____
   c) If yes, how many flocks are located in suburban areas? _____
   d) If yes, how many flocks are located in rural areas? _____

21) Does your agency submit adult mosquito pools for testing? ☐ Yes ☐ No
   a) If yes, how many pools have been submitted to date? _____
   b) If yes, how many pools were submitted from urban areas? _____
   c) If yes, how many pools were submitted from suburban areas? _____
   d) If yes, how many pools were submitted from rural areas? _____

22) Did your agency participate in the dead bird surveillance program in 2004? ☐ Yes ☐ No

23) Did your agency test dead birds via VecTest in 2004? ☐ Yes ☐ No
   a) If yes, does your agency plan to continue testing in 2005? ☐ Yes ☐ No
   b) If no, does your agency plan to initiate testing in 2005? ☐ Yes ☐ No
      i) If no, why not? (check all that apply)
      ☐ Cost ☐ Efficacy ☐ Efficiency ☐ Other_____

24) Did your agency test dead birds via RAMP in 2004? ☐ Yes ☐ No
   a) If yes, does your agency plan to continue testing in 2005? ☐Yes ☐ No
   b) If no, does your agency plan to initiate testing in 2005? ☐ Yes ☐ No
      i) If no, why not? (check all that apply)
      ☐ Cost ☐ Efficacy ☐ Efficiency ☐ Other_____

25) Are you currently submitting, or do you plan to submit, specimens for WNV testing during the "off season" (Nov 2004 – March 2005)? ☐ Yes ☐ No
   a) If yes, which of the following specimens do you plan to submit: (check all that apply)
   ☐ Dead birds ☐ Chicken sera ☐ Adult mosquito pools

26) If additional funding were available, would you increase the number of sentinel chicken flocks in your district? ☐ Yes ☐ No
   a) If yes, by how many? _____

27) If federal funds were no longer available to support the dead bird testing program, would your agency be willing to pay for the cost of shipping and testing birds via RT-PCR (approx. $40/bird)? ☐ Yes ☐ No

28) If federal funds were no longer available to support the dead bird testing program, would your agency be willing to pay for the cost of testing crows via VecTest (approx. $8/bird)? ☐ Yes ☐ No

29) Does your agency have a -70°F freezer? ☐ Yes ☐ No

Control Activities

30) Did your agency adulticide in 2003? ☐ Yes ☐ No
   a) If yes, was adulticide applied via:
      ☐ Ground ☐ Air ☐ Both
   b) If yes, how frequently did you adulticide during the peak of the WNV season in your region (or in August if no WNV transmission in region)?
      ☐ Daily ☐ 2-3x Week ☐ 1x Week ☐ 1-3x Month

31) Did your agency adulticide in 2004? ☐ Yes ☐ No
   a) If yes, was adulticide applied via:
      ☐ Ground ☐ Air ☐ Both
   b) If yes, how frequently did you adulticide during the peak of the WNV season in your region?
      ☐ Daily ☐ 2-3x Week ☐ 1x Week ☐ 1-3x Month

32) Did your agency conduct mosquito control activities outside of your jurisdiction's boundaries during 2004? ☐ Yes ☐ No

33) Overall, what was the public's response to adulticide applications?
   ☐ Favorable ☐ Unfavorable ☐ Mixed ☐ Unknown

34) What steps were taken to inform the public of adulticide applications? (check all that apply)
   ☐ Press releases ☐ Press conferences ☐ Public notices in newspapers
   ☐ Door tags ☐ Neighborhood postings ☐ Other_____

Receiving Surveillance Information

35) Did your agency participate in the statewide vector control conference calls on WNV in August and September? ☐ Yes ☐ No
   a) If yes, should these conference calls be continued in 2005? ☐ Yes ☐ No

36) How did your agency receive WNV surveillance information for your area? (check all that apply)
   ☐ Email reports from DHS ☐ Telephone call from DHS
   ☐ DHS website (www.westnile.ca.gov) ☐ Other_____

37) Which form of communication did you prefer? (check one)
   ☐ Email reports from DHS ☐ Telephone call from DHS
   ☐ DHS website (www.westnile.ca.gov) ☐ Other_____

Website

38) Did you visit the www.westnile.ca.gov website? ☐ Yes ☐ No

a) If yes, how often? ☐ Daily ☐ Weekly ☐ Monthly ☐ Other _____

b) If yes, did you use the website as a means of confirming submitted specimens? ☐ Yes ☐ No

c) If yes, did you use the website as a reference tool for updated maps, information, and educational materials? ☐ Yes ☐ No

d) If yes, did you refer the public to the website as a reference tool for bird identification, information and educational materials? ☐ Yes ☐ No

e) If yes, which section of the website did you visit most frequently?
☐ Preventing West Nile virus ☐ Home ☐ West Nile Basics/Fast Facts
☐ Identify and Report Dead Birds ☐ Maps and Data ☐ Local Agencies
☐ Educational Material ☐ Press/Media ☐ Links

f) Overall, how aware of the website was the public in your district?
☐ Not aware ☐ Somewhat Aware ☐ Aware ☐ Very Aware ☐ Extremely Aware

Response to Surveillance Information

38) Please weight the following surveillance information on a scale of 0-5 (0= not used, 1=least important, 5=most important) in the decision to perform the following prevention and control activities in your jurisdiction:

	Single WNV + dead bird	Multiple (≥ 2) WNV + dead birds in one zip code	Single chicken WNV sero-conversion	Multiple chicken WNV sero-conversions	Single WNV + mosquito pool	Multiple WNV + mosquito pools	Single equine case	Multiple equine cases	Single human case	Multiple human cases
Additional surveillance										
Larviciding										
Adulticiding										
Increase educational activities										

39) Did your agency use the California Mosquito-Borne Virus Surveillance and Response Plan to guide WNV response activities in 2004? ☐ Yes ☐ No

Public Education

40) In the table below, please rate your agency's reliance upon the following activities in your public education campaign. (0=not used, 1=least used, 5=most used). Also, please rate the following activities' effectiveness in increasing public awareness of WNV in your district. (0=not used, 1=least effective, 5=most effective)

	Reliance	Increasing public awareness
Distributing educational materials door-to-door		
Distributing educational materials via mail or community events		
Community education presentations		
Agency website		
Television or radio advertisements		
Billboards		
Press release		
Other		

41) Please indicate which of the following public education activities were initiated before and after WNV detection in your district and whether or not they included the CA WNV hotline phone number. If activity was not used, please check N/A. *Educational materials include published brochures, door hangers, etc.*

	Initiated before WNV detection		Initiated after WNV detection		Included personal protection tips		Included WNV hotline number		N/A
Distributing educational materials door-to-door	Y	N	Y	N	Y	N	Y	N	
Distributing educational materials via mail or community events	Y	N	Y	N	Y	N	Y	N	
Community education presentations	Y	N	Y	N	Y	N	Y	N	
District website	Y	N	Y	N	Y	N	Y	N	
Television or radio advertisements	Y	N	Y	N	Y	N	Y	N	
Billboards	Y	N	Y	N	Y	N	Y	N	
Press release	Y	N	Y	N	Y	N	Y	N	
Other	Y	N	Y	N	Y	N	Y	N	

42) Overall, how aware of the WNV hotline was the public in your district?

☐ Not aware ☐ Somewhat Aware ☐ Aware ☐ Very Aware ☐ Extremely Aware

43) Please weight the surveillance information on a scale of 0-5 (0=not used, 1=least important, 5=most important) in the decision to perform the following prevention activities:

	WNV + Dead bird	Sentinel Chicken Sero-conversion	Positive Mosquito Pool	Equine Case	Human Case
Distributing educational materials door-to-door					
Distributing educational materials via mail or community events					
Community education presentations					
Agency website					
Television or radio advertisements					
Billboards					
Press release					
Other					

44) Did your agency use “Fight the Bite” materials? ☐ Yes ☐ No

Do you have any suggestions to improve the WNV surveillance program?

_____
_____
_____
_____
_____
_____
_____
_____
_____

Thank you for completing this survey!