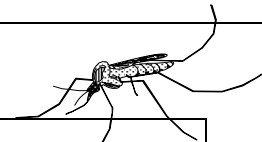


DISTRICT OF COLUMBIA  
DEPARTMENT OF HEALTH  
OFFICE OF ENVIRONMENTAL HEALTH SCIENCE  
AND REGULATION

ARBOVIRUS  
SURVEILLANCE AND RESPONSE PLAN  
2004

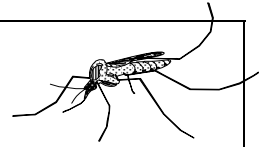
MAY 2004



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## Executive Summary

Under the strong leadership of Mayor Anthony A. Williams, the West Nile Virus Program has been a great public health success story in the District of Columbia. The Department of Health (DOH) has operated a West Nile Virus (WNV) program since WNV was first reported in the United States in 1999. The three foundations of this program are surveillance, mosquito control and outreach and education. In 2003, several cities and states, including Portland, Oregon, Texas, Kentucky and Ohio recognized the District's Arbovirus Response Plan as a model plan and included components from the District Plan into their own plans. The city of Lynchburg, Ohio cited the District's approach to mosquito management as support for a law banning adulticide applications.

DOH has conducted human, avian, mammal and mosquito surveillance since 1999. DOH maintains an extensive database that tracks the presence and spread of the virus. In calendar year 2002, avian surveillance determined that WNV was endemic in District birds and avian testing was discontinued in August 2002. Ever since avian testing was discontinued, DOH continues to track dead bird reports. In 2003, working with the CDC and other federal and regional partners, DOH installed and monitored stationary mosquito traps based upon a grid system through out the District that covered all neighborhoods, federal enclaves, military installations and parks. This consistent and evenly spaced method of trap placement monitors all areas of the District and will again be utilized in 2004.

Since the identification of locally-acquired Malaria in nearby Virginia, DOH enhanced the WNV Response Plan to include monitoring and testing of malaria and other arboviruses. DOH will continue surveillance for malaria, Dengue Fever and other mosquito-borne pathogens when appropriate.

CDC has stated that source reduction and larvicidal applications in catch basins and standing water are essential components to a successful mosquito management program and are the most effective method to reduce mosquito populations and mosquito-borne viruses over time. From 2000 to 2003, DOH staff larvicided proactively and in response to positive birds, mosquitoes and humans and community concerns. The larvicide, a biologic product that arrests the mosquito growth in the larval stage, is placed in catch basins and in standing or stagnant water. In 2004, DOH will continue the extensive larviciding program.

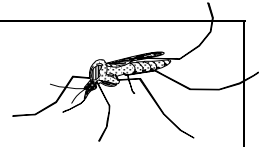
DOH'S outreach and education program reached hundreds of thousands of people in 2003 through public discussions, the distribution of flyers and "hits" on the website. The District's message continues to be protection and prevention. DOH encourages residents to take personal responsibility to prevent conditions for mosquito harborage and to prevent mosquito bites. In 2003, DOH used a number of media channels to get out the message: the DOH website; bulk distribution of informational brochures (in five languages); public presentations; and, door-to-door visits. Staff visited over 20,000 residences door-to-door and distributed over 30,000 brochures in bulk. In 2004, DOH will continue these outreach efforts. In addition, DOH will create a video public service announcement (PSA) with tips to identify potential mosquito breeding sites, to eliminate mosquito harborage and prevent mosquito bites. Furthermore, DOH intends to sponsor a Tire Round-Up campaign for residents who wish to discard old tires – a potential breeding site for mosquitoes. The PSA and Tire Round-Up are subject to availability of funds.

Recognizing the potential threat to public health created by conditions that support the harborage and breeding of mosquitoes, DOH published regulations that impose civil fines and penalties on individuals and businesses that do not abate these conditions and contribute to the risk of mosquito-borne diseases

Due to DOH's aggressive surveillance, mosquito control, outreach and education program, there were only three positive cases of West Nile virus in humans in 2003 residing in the District of Columbia.

In 2004, DOH will continue to fight the spread of West Nile Virus and other mosquito-transmitted illnesses.





## Introduction

This plan outlines the activities for implementing a response to West Nile virus or other arbovirus outbreaks in the District of Columbia. An arthropod-borne virus (arbovirus) is one that is transmitted to vertebrates by biting insects and acarines (ticks). These viruses multiply in both their vertebrate and invertebrate hosts.

This plan is a working document that identifies various specific programs of surveillance, mosquito control and public outreach and education. The *District of Columbia Arbovirus Surveillance and Response Plan 2004* is the District's plan for the organized monitoring of arbovirus activity, vector populations, arbovirus infections in vertebrate hosts and humans and other factors to detect or predict changes in the transmission dynamics of these arboviruses. The surveillance task force includes staff from the District of Columbia's Department of Health, Environmental Health Administration, Preventive Health Administration, Public Health Laboratory and Emergency Management. These offices work collaboratively to develop and implement strategies to decrease the transmission of arboviruses to human and other vertebrate hosts.

West Nile virus (WNV), though known since 1937, had never been detected in the United States until late August and September 1999, when 62 people in New York City and the surrounding areas became sick. Seven people died. From 1999 through 2003, there were 14,163 cases of confirmed West Nile virus human illness in the United States reported to CDC, including 566 human deaths.

### National Surveillance Findings 2003

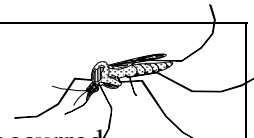
United States: West Nile Virus Activity; Thu 13 Nov to Wed 19 Nov 2003

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This report summarizes West Nile virus (WNV) surveillance data reported to CDC through ArboNET as of 3 a.m., Mountain Standard Time, Wed 19 Nov 2003.

#### Cumulative totals - Humans

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During 2003, a total of 8470 human cases of WNV infection have been reported from Colorado (n = 2477), Nebraska (n = 1727), South Dakota (n = 989), Texas (n = 526), North Dakota (n = 422), Wyoming (n = 339), Pennsylvania (n = 225), Montana (n = 222), New Mexico (n = 202), Minnesota (n = 144), Iowa (n = 142), Ohio (n = 108), Louisiana (n = 105), Kansas (n = 88), Oklahoma (n = 75), New York (n = 67), Mississippi (n = 62), Missouri (n = 59), Maryland (n = 56), Illinois (n = 50), Georgia (n = 42), Indiana (n = 37), Alabama (n = 33), Florida (n = 32), New Jersey (n = 31), Arkansas (n = 25), North Carolina (n = 24), Tennessee (n = 24), Virginia (n = 23), Delaware (n = 16), Massachusetts (n = 16), Kentucky (n = 14), Wisconsin (n = 13), Connecticut (n = 12), Michigan (n = 11), Arizona (n = 8), Rhode Island (n = 7), the District of Columbia (n = 3), New Hampshire (n = 3), Vermont (n = 3), California (n = 2), Nevada (n = 2), Idaho (n = one), South Carolina (n = one), Utah (n = one), and West Virginia (n = one).





Of 8333 (98 percent) cases for which demographic data were available, 4399 (53 percent) occurred among males; the median age was 47 years (range: 1 month to 99 years), and the dates of illness onset ranged from 28 Mar to 1 Nov 2003. Of the 8333 cases, 189 fatal cases were reported from Colorado (n = 45), Texas (n = 27), Nebraska (n = 21), South Dakota (n = 13), New York (n = 8), Wyoming (n = 8), Pennsylvania (n = 7), Maryland (n = 5), Missouri (n = 5), Georgia (n = 4), Iowa (n = 4), Kansas (n = 4), Louisiana (n = 4), Minnesota (n = 4), New Mexico (n = 4), North Dakota (n = 4), Ohio (n = 4), Alabama (n = 3), Delaware (n = 2), Indiana (n = 2), Montana (n = 2), New Jersey (n = 2), Arizona (n = one), Illinois (n = one), Kentucky (n = one), Michigan (n = one), Mississippi (n = one), Tennessee (n = one), and Virginia (n = one).

#### Cumulative totals - Blood Donors

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A total of 724 presumptive West Nile viremic blood donors have been reported to ArboNET, including 626 (86 percent) from the following 9 western and midwestern states: Colorado, Kansas, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming. Of the 593 donors for whom data were reported completely, 6 (1 percent) subsequently had neuroinvasive disease (median age: 45 years; range: 28 to 76 years), and 96 (16 percent) had West Nile fever.

#### Cumulative totals - Animals

---

In addition, 11 213 dead birds with WNV infection have been reported from 42 states, the District of Columbia, and New York City. WNV infections also have been reported from 41 states in horses (n = 4105), dogs (n = 27), squirrels (n = 17), cats (n = one), and unidentified animal species (n = 32).

#### Cumulative totals - Sentinel chickens and horses

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During 2003, WNV seroconversions have been reported in 1377 sentinel chicken flocks from 15 states. Of the 61 seropositive sentinel horses reported, Illinois reported 43, West Virginia reported 8, Minnesota reported 7, and South Dakota reported 3. In addition, seropositivity was reported from one other unidentified animal species.

#### Cumulative totals - Mosquito pools

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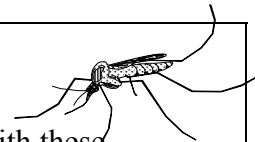
A total of 7702 WNV-positive mosquito pools have been reported from 38 states, the District of Columbia, and New York City.

### Routes of Transmission

West Nile virus (WNV), a mosquito-borne flavivirus introduced recently to North America, is a human, equine, and avian neuropathogen. The majority of human infections with WNV are mosquito-borne; however, laboratory-acquired infections with WNV and other arboviruses also occur. There were two recent cases of WNV infection in laboratory workers, without other known risk factors, who acquired infection through percutaneous inoculation. Laboratory workers handling fluids or tissues known or suspected to be WNV-infected should minimize their risk for exposure.

In 2002, newly recognized mechanisms of person-to-person WNV transmission were described by health officials including transmission from mother to infant through breast milk. Health officials believe that WNV can be transmitted via organ transplant and blood transfusion. However, the risks of





contracting WNV by these routes are very small as compared with other risks associated with these treatments. Evidence is also mounting that WNV may be transmitted to babies in breast milk. WNV genetic material was transiently present in the breast milk of a woman with WNV infection and measurable WNV-specific IgM was detected in her baby. Despite this finding, the risk of WNV illness in young children is very low. Only 4 infants in the US are known to have become infected with WNV during the 4 years that the virus has been reported in the US. There is also increasing evidence of intrauterine West Nile virus infection. WNV has not been previously associated with intrauterine infection or adverse birth outcomes. There was a case of transplacental WNV transmission. Pregnant women should take precautions to reduce their risk for WNV or other arboviral infection and should undergo diagnostic testing when clinically appropriate.

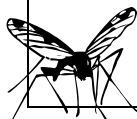
### **District of Columbia Perspective**

Evidence of West Nile virus first appeared in the District in 2000 as detected through avian surveillance. Thirteen birds were tested for West Nile virus in 1999. All tested negative. In 2000, five birds tested positive for West Nile virus with the first collection date of September 26. There was no other positive West Nile activity in the District. In 2001, nine hundred fourteen (914) birds were collected and four hundred forty-four (444) birds were processed for testing. Three hundred sixty birds (360) tested positive, with a rate of positivity of 81.08%. Eighty-four (84) birds tested negative. Eight hundred forty-one (841) mosquito pools and four thousand three hundred sixty-eight (4,368) individual female mosquitoes were submitted for testing. Three pools of *Culex* mosquitoes tested positive. In 2001, there was no human or mammal positive West Nile activity in the District.

In 2002, The District continued to conduct human, avian, mosquito and mammal surveillance. Nine hundred five (905) birds were collected and three hundred forty (340) birds were processed for testing. One hundred thirty-four (134) birds were disposed of, one hundred seventy-five (175) birds tested positive and thirty-one birds (31) tested negative with a rate of positivity of 84.95%. Avian surveillance was discontinued in August of 2002 when West Nile virus was considered endemic to the region. DOH collected and tested mosquitoes in cooperation with the US Army, The National Zoo and the National Park Service. One thousand three hundred fifteen (1315) mosquito pools and ten thousand seven hundred fifty-five (10,355) individual female mosquitoes were collected and submitted for testing. Eighty-four (84) mosquito pools tested positive for West Nile virus.

In 2003, The District continued to conduct human, avian, mosquito and mammal surveillance. DOH did not collect and test dead birds, but did collect dead bird reports. DOH collected and tested mosquitoes in cooperation with the US Army, The National Zoo and the National Park Service. Two thousand one hundred forty-four (2,114) mosquito pools and twenty thousand sixty-two (20,062) individual female mosquitoes were collected and submitted for testing. Forty-nine (49) mosquito pools tested positive for West Nile virus in the District of Columbia.

Data indicates that the District's WNV program is a great public health success. In response to WNV-positive mosquito pools, the Department of Health staff larvicides the area and distributes information door to door to District residents in the neighborhoods. The health information material has been translated into Spanish, Korean, Vietnamese, and Chinese and emphasizes prevention and protection. Staff also speak at neighborhood meetings and work with residents to evaluate their property to eliminate potential mosquito breeding sites. The number of mosquitoes collected is significantly reduced in the areas that are larvacided extensively.





The *District of Columbia Arbovirus Surveillance and Response Plan, 2004*, follows the Centers for Disease Control and Prevention's (CDC) *Guidelines for Arbovirus Surveillance in the United States* and *Epidemic/Epizootic West Nile Virus in the United States: Revised Guidelines for Surveillance, Prevention and Control*. Both documents emphasize surveillance methods to assess risk levels and protection and prevention strategies. In addition, the District is a member of the Metropolitan Washington Council of Governments (COG) regional Emerging Pathogens West Nile virus Planning Committee. The focus of the District's arbovirus surveillance program is the detection, reporting, and management of WNV and other arboviruses to prevent human epidemics and animal epizootics. The laboratory will test for additional arboviruses when performing tests on humans, equines, mosquitoes, and birds, as requested.

This plan focuses on the surveillance of human, mosquito, avian, and mammal populations as indicators of the presence of the WNV. As the primary vector, the mosquito is the key concern in the development of this response plan. DOH staff utilize the identification of mosquito species, their location, population numbers and presence of infection to assess the current risk to the community and the necessary response steps based upon that perceived risk.

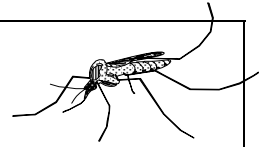
Generally, WNV does not cause symptoms in people who have been exposed to it. However, in some individuals, WNV can cause a very mild infection (West Nile Fever) including fever, muscle aches, rash, swollen lymph nodes, and a "sick" feeling. This illness starts about 3-15 days after the mosquito bite, lasts a few days, and then subsides.

A very small percentage (<1%) of people infected with WNV or other arboviruses can experience neuroinvasive disease which affects a person's nervous system. Specific types of neuroinvasive disease include: WN encephalitis, WN meningitis and WN meningoencephalitis.

Encephalitis is an inflammation of the brain, meningitis is an inflammation of the membrane that surrounds the brain and the spinal cord and meningoencephalitis is an inflammation of both the brain and the membrane surrounding it. Encephalitis and meningitis due to arboviruses can cause death. Data from 1999 through 2003 indicate that deaths from WNV infection occur mostly among persons greater than 55 years of age.

The following pages describe the District's 2004 plan to respond to West Nile and other arboviruses through surveillance, control, analysis, and education activities.





## Human Surveillance

### Purpose:

DOH will continue to conduct active human surveillance in cooperation with key area hospitals and the local medical communities. Increased monitoring for neuroinvasive disease is a necessary tool for public risk assessment.

The most severe type of disease due to a person being infected with West Nile virus is sometimes called neuroinvasive disease because it affects a person's nervous system. Specific types of neuroinvasive disease include: West Nile encephalitis, West Nile meningitis or West Nile meningoencephalitis. Encephalitis refers to an inflammation of the brain, meningitis is an inflammation of the membrane surrounding the brain and the spinal cord, and meningoencephalitis refers to inflammation of the brain and the membrane surrounding it. West Nile Fever is another type of illness that can occur in people who become infected with the virus. It is characterized by fever, headache, tiredness, aches and sometimes rash. Although the illness can be as short as a few days, even healthy people have been sick for several weeks.

In 2000, there were 16 reported cases of encephalitis documented from May - November in neighboring Maryland; WNV was not attributed to any of those cases. In 2001, the first cases of WNV in neighboring Maryland were identified through enhanced surveillance (3 WN encephalitis cases, 3 WN aseptic meningitis cases). Two of these six patients died. This illustrates the importance of a strong surveillance program. There were no reported cases of human WNV infection in the District in 2000 or in 2001.

In 2002, there were eighty (80) human specimens tested for West Nile virus. Thirty-one (31) samples tested positive, twenty-eight (28) samples tested negative. Three (3) samples were "probable" and eighteen (18) samples are considered "pending" because there is some information that is unavailable.

In 2003, there were forty-three (43) human specimens tested for West Nile virus. Twenty-five (25) tested negative, three (3) tested positive, six (6) are "probable" and nine (9) remain "pending".

### Strategy:

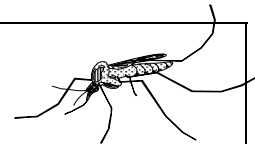
DOH staff shall investigate all reported cases of neuroinvasive disease in the District during the WNV surveillance period to ensure detection of WNV or other arboviral disease or bioagent. These investigations may include blood tests or other tests to detect WNV in the brain or the spinal fluid. DOH staff shall inform public health officials and District agencies about this disease in an effort to decrease the transmission of the virus, through the findings of the human surveillance.

### Actions:

1. DOH Bureau of Communicable staff informs physicians and other health professionals about WNV disease through a Physician's Alert- See Appendix C. The Physician's Alert contains reporting criteria and specimen submission protocol and shall be forwarded to physicians and hospitals. The Alert reminds doctors and hospital infection control personnel (ICPs) that encephalitis and meningitis can be indicators of arboviral infection. Any case of encephalitis or



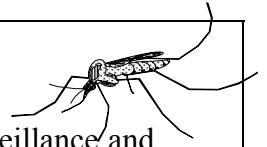




meningitis must be reported to DOH no later than the next working day.

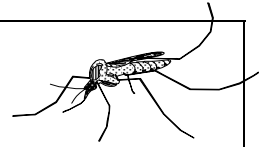
2. DOH shall send a fact sheet containing the case definition from CDC to all physicians. The letters are sent at the beginning of the West Nile virus transmission year and again approximately two months later as a reminder. The national case definition for arboviral encephalitis should be used to classify cases as confirmed or probable, once appropriate laboratory results are available. In CDC publications of national arbovirus surveillance data, no distinction is made between confirmed and probable human cases for the purposes of case counting.
3. All DOH pertinent parties from the Animal Disease Prevention Division, Public Health Laboratory, Bureau of Communicable Disease and Bureau of Epidemiology and Health Risk Assessment will contact each other by phone as needed to confirm that all parties have exchanged all necessary information. In addition, a staff person from the West Nile virus program in the Animal Disease Prevention Division will prepare and circulate a spreadsheet daily to keep all parties informed of all cases.
4. A West Nile virus staff person will call all District hospitals on a weekly basis to determine if any new cases fall within the case definition.
5. A Bureau of Epidemiology and Health Risk Assessment, Division of Disease Surveillance and Investigation staff person shall contact physicians in appropriate specialties (i.e. infectious diseases neurology, and initial care) and hospital infection control personnel on a regular basis to inquire about patients with potential arboviral infections.
6. DOH Bureau of Epidemiology and Health Risk Assessment, Division of Disease Surveillance and Investigation shall, as a special surveillance project, utilize syndromic surveillance of emergency department logs for conditions including, but not limited to fever with rash or lymphadenopathy.
7. CDC has notified all blood collection agencies of the protocol for testing their blood supply. If the test is positive, the blood is removed from the blood supply. DOH will send a letter informing blood collection agencies (hospitals, Red Cross) to report presumptive viremic donations (PVDs).
8. DOH Bureau of Communicable staff shall blast fax the Physician's Alert to over 900 hospital ICPs, family practitioners and pediatricians. In addition, the staff shall place the Alert on the web site and forward it to the Medical Society of DC (MSDC) and the Medical Honor Society, MEDCHI.
9. CDC has notified all commercial lab directors to indicate specimen testing requirements and protocol. For samples sent directly to a commercial lab, the commercial lab must then send a sample to the PHL for testing. Commercial labs must notify the PHL immediately of any positive result. The Director of the Public Health Lab will establish protocols for accepting samples from commercial labs for testing at the PHL.
10. DOH shall prepare a WNV Human Specimen Laboratory Testing Algorithm for distribution and placement on the web site.
11. The DOH Public Health Laboratory will conduct all human specimen testing and inform all pertinent parties by email and phone of positives results.





12. DOH Bureau of Epidemiology and Health Risk Assessment, Division of Disease Surveillance and Investigation shall produce a weekly, monthly, annual reports on the human WNV surveillance data.
13. DOH shall provide professional education to hospitals and interested medical and nursing groups.
14. DOH shall consider the following actions in the event of a positive human case and/or death:
  - a. Notify email distribution list, per HIPAA regulations.
  - b. Notify the Director of Communication and Director of DOH to determine whether to issue a press release emphasizing protection and prevention.
  - c. Contact Mayor's office.
  - d. Call CDC to report the case verbally and discuss recommendations.
  - e. Inform COG Health Officers and other pertinent and regional partners.
  - f. Conduct a conference call with CDC or COG Health Officers.
  - g. Discuss the case with hospital staff and caretakers.
  - h. Evaluate the situation and educate caretakers and other residents of the home regarding prevention and protection.
  - i. Evaluate the necessity to conduct a serological survey in the area.
  - j. Send a DOH team to the neighborhood to identify and reduce potential mosquito breeding sites.
  - k. Distribute outreach and education information in an eight square block area surrounding the location of the positive human case.
  - l. Larvicide in the eight square block area of the address of the victim
  - m. Schedule additional community speaking engagements as necessary.
  - n. Complete the appropriate DOH reporting forms.
15. Information on reportable cases of neuroinvasive disease will be shared between the West Nile virus program, the PHL and the Bureau of Communicable Diseases.
16. Results of human testing for WNV and other arboviruses (EEE, SLE, WEE & LAC) will be collected and analyzed by DOH on a weekly basis, and the results forwarded to CDC.





## Mosquito Surveillance

### Purpose:

Mosquitoes are the vectors for the transmission of certain diseases to humans and animals. Therefore, it is important to monitor various mosquito species throughout the District, especially those species known to transmit arboviruses. It is equally important to analyze the mosquitoes to determine if they are carrying West Nile virus, Malaria, Dengue fever or any other arbovirus.

The risk of disease transmission correlates directly to the presence of mosquito carriers that test for arboviruses and their densities. Mosquito surveillance enables staff to conduct risk assessment, systematic planning, and a structured response. Activities involve trapping, speciating, determining population densities, and arboviral testing of resident mosquitoes and MIR

Identifying mosquito-breeding sites for elimination or treatment, particularly those located near susceptible human populations, is a continuous and critical activity to support a formulation of an effective mosquito management program. Based on the results DOH staff can assess the potential risk for disease in local animal or human populations.

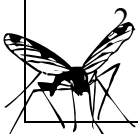
### Strategy:

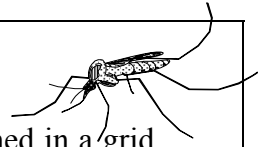
Multiple mosquito genera have been identified in the District as carriers of West Nile virus and malaria. The Department of Health has made a commitment to identify and test mosquitoes for diseases that may threaten the public health and safety of the residents and visitors in the District. *Culex pipiens* is the predominant carrier of the West Nile virus in the Washington, D.C. area. The focus of mosquito surveillance is to trap and test *Culex* to determine infection rates. The CDC gravid trap, designed specifically to trap this species, will be the main tool for this surveillance. Previous experience has shown that the gravid traps work extremely well in the District. In addition, all collected *Anopheles* will be tested for malaria. Other collected mosquitoes may be tested for yellow fever, Dengue fever and other arboviruses.

DOH and its federal and local partners have established stationary mosquito trap locations based on a grid system to cover the city with an even distribution of traps. In addition, staff will determine locations of other mosquito traps that will be moved in response to events, such as, increased mosquito activity or increased numbers of specimens testing positive. DOH will work cooperatively with the US Army, National Park Service and National Arboretum to set traps and collect mosquitoes from trap locations that are owned by the federal partners to ensure complete coverage per the grid configuration. Also, several light traps containing CO<sub>2</sub> and mosquito magnets will be added to the surveillance system for capture of various mosquito species.

### Actions:

1. During the active mosquito season (typically April through October), the District of Columbia Department of Health will use special equipment to trap mosquitoes throughout the District.
2. Through a partnership between the DC Department of Health, National Park Services (Central,

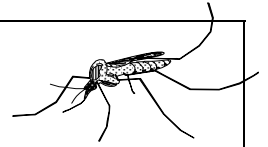




East and C&O Canal), and the Department of Defense, trap locations will be determined in a grid system throughout the District, with a maximum of 1.5 miles between any two traps.

3. The staff will set approximately 50 traps twice per week with two trap nights per trap per setting.
4. The National Park Service and the National Arboretum will purchase traps and the DC Department of Health staff will assist the National Park Services and the National Arboretum in mosquito trap setting, collection, speciation and testing.
5. Staff from the US Army mosquito-testing lab will assist in training DOH staff in mosquito identification, collection, specimen preparation, and transportation.
6. DOH staff has established stationary trap locations following a grid and several mobile traps, with location dependent upon various factors, such as, positive test results from other surveillance systems.
7. Frequency of trap setting may change based on mosquito density or minimum infection rates. Other traps, such as CDC light traps and mosquito magnets will be set in the District as determined by staff based on the species of mosquito that will be targeted and numbers of mosquitoes collected.
8. Mosquitoes will be transported to the DC Public Health Lab for arboviral testing. Prior to shipping DOH staff will speciate and analyze the mosquitoes for the presence of West Nile and other mosquito-borne diseases. When testing is complete, results will be sent to the Department of Health. DOH staff will enter test results into a special database, called Arbo-NET<sup>®</sup> and upload the information to CDC in Atlanta, Georgia. Information collected on mosquito population numbers and distribution will be collected during field studies and will be analyzed simultaneously with the mosquito virus test results. These results will help to identify possible areas of risk for WNV transmission by mosquitoes in the District.
9. DOH staff will procure sampling equipment for larval investigations. Equipment includes; dip sticks, felt sampling strips, and containers. Investigations will be on an as needed basis to determine which species are utilizing breeding sites.
10. When a positive mosquito pool is identified, DOH will consider the following actions:
  - a. Forward the information to the DOH Director of Communications to determine whether a press release will be issued.
  - b. Distribute outreach and education information in an eight square block area surrounding the location of each positive mosquito pool.
  - c. Larvicide in the eight square block area as the address of the positive pool
  - d. Work with residents to identify and eliminate potential mosquito breeding sites.
  - e. Upload information to CDC.





## Avian Surveillance

### Purpose:

The District of Columbia collected and tested dead birds from 2000-2002 as an early indicator of the presence of West Nile virus. Based on high levels of positive birds, 85%, DOH considers WNV to be endemic in the bird population in the District. Dead bird collection is no longer used as a primary tool to monitor disease and disease risk in the District of Columbia. The District will institute a live wild bird surveillance program to determine if asymptomatic birds may host the virus.

Several states, including the state of Maryland, have discontinued an active dead bird collection and testing program.

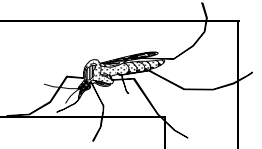
### Strategy:

The Department of Health, in consultation with CDC, now considers West Nile virus endemic and enzootic in the District of Columbia. The value of collecting and testing dead birds as a predictor of virus activity is significantly diminished and may be considered unnecessary. Resources are better spent through outreach and education to educate and inform the population about prevention and protection measures. The District may test certain avian species, such as raptors or birds from endangered populations or exotic bird collections.

### Actions:

1. The Department of Health will monitor CDC updates regarding avian surveillance.
2. Various sites throughout MD and DC will be selected for mist netting in an attempt to detect the species of birds that may be reservoirs of WNV. Wild avian species will be humanely captured in accordance with USFWS guideline in areas with an ongoing or previous history of WNV activity; serum (and/ or swab, tissue) samples will be obtained. The bird will be aged, sexed, banded, recorded and released. Where possible, serology results will be matched with swab or tissue sample results. Data on banded birds will be submitted to the National Bird Banding Lab at the Patuxent Wildlife Research Center, Laurel, MD. U.S. FWS permits have been obtained for this purpose.
3. The Department of Health will assist the National Zoo to monitor the wild bird collection and collect dead bird reports





## Equine and other Mammal Surveillance

### Purpose:

DOH shall conduct passive mammal surveillance in cooperation with area veterinarians, wildlife rehabilitators, local animal shelters and barn staff. Increased monitoring for encephalitic disease is a necessary tool for public risk assessment. West Nile virus can infect other mammals and is particularly virulent in horses and causes a nearly 40% mortality rate. Mammals are considered dead end hosts, although some experiments under extreme scientific conditions have produced some level of transmission from animal to animal in cats. There is not enough scientific evidence to deem other mammals a suitable indicator at this time.

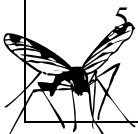
It is important to alert veterinarians about this disease, provide equine testing information if WNV or other arboviral infections are suspected, and encourage equine vaccination against WNV. DOH recommends vaccination of all equines residing or working in the District.

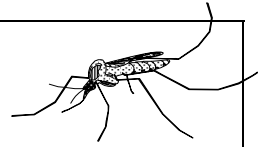
### Strategy:

It is essential to monitor equine and other mammal West Nile virus activity. Veterinarians will be encouraged and instructed to inform DOH of any possible West Nile virus infection, particularly those animals that present with a neurological component. DOH will investigate and take measures as necessary.

### Actions:

1. DOH will notify veterinarians about the WNV surveillance plan for horses and other mammals and give specimen submission recommendations for vaccines. The notification letter will inform veterinarians about the clinical signs of WNV, how to obtain testing for horses, information on the WNV equine vaccine and reporting protocol for equines and other mammals.
2. If a horse is suspected of having WNV infection, veterinarians will be asked to collect appropriate specimens (i.e. CSF, blood, necropsy samples) for testing or analysis. The DC Public Health Laboratory will perform virus isolation and polymerase chain reaction (PCR) on brain tissue and IgM capture ELISA on serum samples. Cerebrospinal fluid (CSF) has not been a useful diagnostic specimen to detect WNV in horses; therefore, its submission for arboviral testing will be discouraged. Confirmatory testing of sera will occur at NVSL in Ames, Iowa pending approval of the USDA/APHIS Area Veterinarian in Charge (AVIC).
3. Necropsies (thorough examinations of the bodies of dead horses to detect cause of death) will be performed, for a fee, on horses at any of the five Maryland Animal Health Diagnostic Laboratories, if the cause of death suggests WNV or other arboviral diseases causing encephalitis. Equine testing may take several weeks to complete.
4. Small mammal traps will be set at the location of mist nets to detect the virus activity in various wild mammals. Serum (and /or swab, tissue) samples will be collected from wild mammals and submitted for WNV detection.
5. Once an equine or other mammal has been WNV-confirmed, DOH will consider the following





actions:

- a. Inform COG Health Officers, District veterinarians and other partners.
  - b. Test other mammals such as squirrels on a random basis.
  - c. Recommend WNV vaccine to owners of horses and police department in District.
  - d. Submit data results to the Director of Communications to determine if a press release is in order.
  - e. Contact animal owner and stable manager to discuss situation and educate them about prevention and protection.
  - f. Evaluate necessity for serological survey to be conducted at the location of the positive equine or other mammal.
  - g. Distribute outreach and education information in an eight square block area surrounding the location of the positive equine or other mammal.
  - h. Larvicide in square block area as address of mammal testing positive for WNV.
  - i. Schedule additional community speaking engagements as necessary.
  - j. Complete DOH reporting forms.
  - k. Upload data to CDC.
6. Results of horse blood testing and of horse necropsies will be collected, analyzed, and reported to CDC on a weekly basis.

**Note:** Protection of horses involves vaccination and keeping horses stabled inside during high mosquito feeding times, i.e., dusk and dawn. Insect-proofing stables and use of repellents are strongly recommended. USDA approved an equine WNV vaccine in 2002 that has proved to be effective and safe.





# Mosquito Management

## Purpose:

The safest and most successful technique in controlling mosquito populations is to identify and eliminate potential mosquito breeding sites and mosquito harborage by removing standing pools of water (e.g. waste tires, yard clutter, and neglected swimming pools). Introduction of natural predators, such as goldfish, or larvicidal applications to pools of water can also be effective in reducing larval hatching in those sites. To minimize the public health risk of WNV, other arboviruses and other diseases, it is important to reduce the sources of standing water and supplement by larviciding as a mosquito management tool to reduce the mosquito population.

CDC has stated that larvicidal applications in catch basins and standing water is an essential component to a mosquito management program and is the most successful method to reduce mosquitoes over time. In addition, the CDC recommends larvicidal applications rather than spraying for both efficacy in reducing mosquito populations, environmental factors and cost effectiveness. Best practices also indicate that preparation and enforcement of nuisance legislation contributes to mosquito elimination. DOH staff will apply larvicide to catch basins and standing water. Adulticiding only kills mosquitoes that are flying and remains effective for only a few hours. The efficacy of adulticiding is open for debate and is not considered an effective tool for mosquito management or control through only one application, or, over time, as shown through scientific research. Reapplications of adulticide may compound negative health effects of pesticide usage.

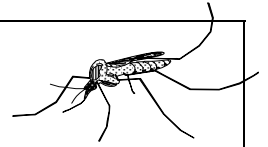
## Strategy:

DOH, following CDC recommendations, shall apply larvicidal treatment to mosquito breeding sites beginning early and lasting late into the season. Sites receiving larvicidal treatments, as outlined in other sections of this document, will be in response to both positive mosquito pool collections and positive human sites. These treatments will be in an eight square block area from the determined site of the virus. Staff collected significantly smaller numbers of mosquitoes in mosquito traps set in areas where larviciding was applied. Larviciding appears to be an inexpensive and effective method for mosquito control and reduction and significantly aided in the protection of humans in the District against West Nile virus.

The District does not expect to spray for adult mosquito control for many reasons.

- **Washington, DC has the highest asthma rate in the country (2.5 times the national average).** Aerosolized pesticides can trigger asthma and aggravate respiratory conditions. To lessen the negative effects of spraying, it would be necessary to have every person remain indoors for several hours after spraying. Broadcast aerosol applications of pesticides, even at night, will elicit a negative public response.
- **Forty percent (40%) of the land in Washington, DC is federally owned. Embassies are located on foreign soil.**  
The District does not have authority to apply larvicide or adulticide products at embassies. Multiple jurisdictions within the confines of the District create difficulty in developing and implementing policy. Pesticides from aerial or ground ULV applications can drift and potentially cause liability issues.
- **Washington, DC is home to an endangered species (Hays Spring Amphipod) and a rare**





**invertebrate (Kenk's Amphipod)**

As aquatic arthropods, these shrimp-like organisms are extremely sensitive to pesticide residues. These species are found nowhere else in the world. Hays Spring Amphipod is known only from a spring on the grounds of the National Zoo and the Kenks Amphipod is presently only known from a site in Rock Creek Park.

- **The Asian Tiger Mosquito (*Aedes albopictus*), a West Nile Virus vector, is a day flying mosquito.**

Application of pesticide sprays during the evening would have limited effect on this species.

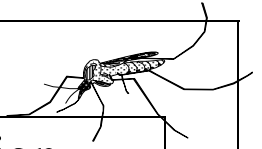
- **Non-target organisms would be affected.**

Broad-spectrum insecticides such as Malathion and Sumithrin will kill many insects that are unintended targets.

**Actions:**

1. DOH shall begin larvicidal applications as weather conditions become conducive to mosquito breeding activity.
2. Larvicidal application sites are initially determined based on a grid-system throughout each ward in the District.
3. Larvicide will be applied in an eight square block zone surrounding the location of positive mosquito pools from surveillance year 2002. DOH staff shall larvicide each grid location t approximately 3 times per year.
4. As positive WNV sites become known through surveillance measures, larvicide will be applied in eight square block zones surrounding each positive location and repeated every four to six weeks.
5. Staff will enforce local ordinances prohibiting the breeding and harborage of disease-causing insects.
6. DOH will notify in writing to the D.C. Water and Sewer Authority (DCWASA) of the need for DCWASA to monitor, assess, clean and maintain the catch basins located throughout the District.
7. DOH will contract with a sewer-baiting vendor to aspirate for adult mosquitoes, package and deliver to DOH for speciating and testing. DOH expects approximately 2,000 sewers to be sampled.





## Public Information, Outreach & Education Campaign

### Purpose:

The DOH will inform District citizens of the risk from arboviruses and inform them of current DOH surveillance, prevention and management strategies. Public cooperation is essential to help reduce the risk of WNV infection by identifying and eliminating mosquito-breeding sites and taking personal protective measures.

For successful implementation, DOH shall provide information to the public, healthcare communities, and government agencies. Flyers, web sites, news briefs, bulletins, and physician alerts exist for distribution to targeted populations. Press releases will be issued as required.

The DOH shall release educational campaigns seasonally based upon the mosquito life cycle and current threats to citizen health. Information will be developed accentuating targeted messages for specific time periods. There will be early year, mid year and late year messages.

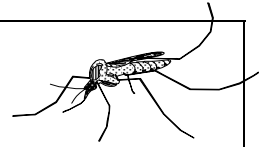
### Strategy:

The development of multiple targeted messages distributed throughout the surveillance year is a strategy that was used successfully in New York in 2002. Outreach and education information was considered an essential component in protecting the public health and safety of the District residents and visitors.

### Actions:

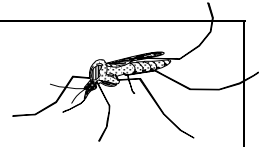
1. The Mayor shall conduct a press conference to announce the publication and implementation of this Plan following approval.
2. DOH shall establish the West Nile Virus Call Center on or about May 1 or earlier as indicated by environmental and meteorological conditions.
3. DOH shall update the public with informational materials concerning West Nile virus infections and ways to minimize mosquito exposure. These documents will be made available by request through the Call Center and on the DOH website.
4. DOH will create a video public service announcement (PSA) on the topics of personal protection, use of repellants, identification and elimination of environmental conditions that may be conducive for the breeding and growth of mosquitoes.
5. DOH in partnership with the Department of Public Works (DPW) and other agencies will conduct a Tire Round-Up in late Spring. This program will decrease the number of old tires in the community provide habitat for the breeding and growth of mosquitoes by providing a location where residents may bring old tires for recycling – See Appendix [F].
6. Representatives from DOH will be available to answer questions from the public and media. DOH Office of Communication will handle the coordination of media requests.





7. The public education campaign will emphasize the following– See Appendix [G]:
  - Personal protection and prevention methods (use of repellents, wearing clothing on extremities, staying indoors at dusk and dawn).
  - The elevated risk to immunocompromised and elderly citizens of developing serious symptoms from WNV infection.
  - How to eliminate sites around residential areas, commercial establishments, and recreational areas where mosquitoes can breed and develop.
  - Where and whom to call for further information about mosquito control.
  - Landscaping tips to discourage mosquitoes from breeding on properties.
  - Identification and elimination of environmental conditions in cemeteries (i.e. standing water in decorative urns) and open spaces that may be conducive to the breeding and growth of mosquitoes.
8. DOH shall distribute information to healthcare providers, residential facilities, churches, recreation centers, Office of Maternal and Child Health (OMCH), Addiction Prevention and Recovery Administration, public schools and other government agencies.
9. If mosquitoes in a given area are determined to have WNV, a public education campaign will focus directly on that area.
10. Other field personnel in DOH, such as food safety inspectors, will distribute brochures and other information.
11. All pertinent information, such as weekly reports, mapping and brochures will be provided to the Mayor and will be available on the web. The web site will be updated every two weeks or less.





## Public Health Laboratory

### Purpose:

The District of Columbia Public Health Laboratory expanded capabilities to conduct comprehensive West Nile Virus arboviral testing in 2004.

All arboviral suspect specimens will be tested in the DC Public Health Laboratory (DC PHL). The laboratory will run screening PCR and confirmatory PRNT on both human and animal specimens as indicated. The PHL will conduct screening and confirmatory testing on all in-patient submissions from District hospitals and on specimens initially determined positive by commercial labs.

Mosquito screening for arboviruses will also be conducted at DCPHL using CDC approved protocols.

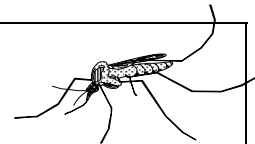
### Strategy:

The District of Columbia has expanded laboratory capacity to permit both human and mosquito arboviral testing to be completed in house in order to protect the public health and safety of the residents and visitors in the District. Increased analytical monitoring for encephalitic disease is a necessary tool for public health risk assessment.

### Actions:

1. Infrastructure for West Nile Virus testing has been developed at the DCPHL. The necessary equipment and CDC recommended protocols for human specimen testing are ready for use. Human specimens will be tested by PCR for WNV, SLE, and other arboviruses as appropriate.
2. Staff training for West Nile Virus testing is complete.
3. A West Nile Virus validation study has been completed.
4. Proficiency Testing has been initiated.
5. The DCPHL will adhere to all HIPPA regulations. Patient information will be kept strictly confidential and test results will be forwarded to appropriate parties by secure means only.





## Information Technology

### Purpose:

Monitoring infectious and communicable disease cases within and around the District Metropolitan Area is based on compulsory reporting requirements for emergency and infection control departments, clinical laboratories, physicians, and both District and Federal legislative mandates. Presently, there is no overall integrated IT application architecture at DOH. The current National Electronic Telecommunications System of Surveillance (NETSS) does not provide for the electronic transmission of information from healthcare providers and the Department of Health. Information is conveyed by fax, telephone or mail.

The Department of Health is now developing the Washington Automated Disease Surveillance System (WADSS), a new automated surveillance system based on the CDC's National Electronic Disease Surveillance System (NEDSS). The purpose of this system is to take advantage of contemporary technology to make reporting between health providers, state/local public health agencies, and CDC both more rapid and timely, and consistent. It will also allow for the integration of the Syndromic Surveillance System for Bioterrorism with other infectious disease databases.

Currently, the West Nile Virus Database is an Access Database and data received by phone or fax are entered into the database by a program staff. With the introduction of Geographic Information Systems (GIS) into the science field, tracking the spread of disease has become easier. Benefits of a GIS-based system include the early warning of WNV activity, targeted remediation, and effectiveness in planning and controlling costs of remediation efforts, ability to readily map "hot spots". This system will also decrease administrative costs and increase program management efficiency.

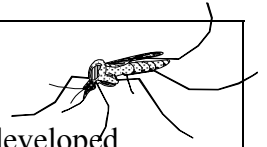
With the introduction of Geographic Information Systems (GIS) into the science field, tracking the spread of disease has become easier. Benefits of a GIS-based system include the early warning of WNV activity, targeted remediation, and effectiveness in planning and controlling costs of remediation efforts, ability to readily map "hot spots". This system will also decrease administrative costs and increase program management efficiency.

Through handheld computers using GIS technology, surveillance technicians can catalogue their actions. Route creation can be designed for larvicidal applications with near-real time collection of data for effective route management and reporting.

### Actions

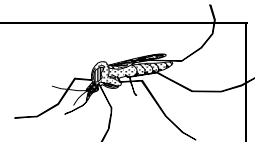
1. Continue to include West Nile Virus staff in the NEDSS and Bioterrorism Surveillance Committee.
2. Improve coordination and integration of data collection through the Washington DC automated Disease Surveillance System.





3. Secure transmission of data via a web-based system. A web-based system is being developed for the NEDSS and users will be provided with passwords to access the system
4. Conduct and support web browser-based data entry and management
5. Accept, route and process electronic HL7 messages containing laboratory, clinical, information and integrate with mosquito and avian databases
6. Develop an active data translation and exchange (integration broker) functionality
7. Develop data reporting and visualization capability
8. Implement a security system and appropriate security policies.
9. Train staff on efficient use of Arc Pad.
10. Complete installation of GIS equipment and programs.





## Data Analysis and Reporting

### Purpose:

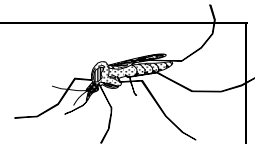
Decision making process under uncertainty is largely based on application of statistical data analysis. Information from the West Nile Virus Surveillance System can be used to compile and produce graphical displays and animations showing the pattern and spread of the virus. Other analyses can be done to detect clusters of infections and to determine the geographic origin of the outbreak.

The surveillance system will provide basic information on the spatial distribution of WNV. The combination of this data with information about weather conditions, over space and time, will provide the foundation for developing spatial analytical and forecasting models. It is imperative that data are compiled accurately and forwarded to various partners in a timely manner.

### Actions:

1. Improve coordination and integration of data collection the Washington DC automated Disease Surveillance System.
2. Develop a comprehensive set of basic data elements as indicated in the NEDSS standards.
3. Continue to include West Nile Virus staff in the NEDSS and Bioterrorism Surveillance Committee
4. Compile ground meteorological and remotely sensed data for the District of Colombia for an assessment of seasonal climatic and environmental change
5. Merge of enviro-climatic profiling with avian and mosquito collection data for use in delineating the seasonal changes in population densities. The merger of this data will be produced within a Geographic Information System (GIS) framework
6. Provide simple descriptive analyses of data and show trends on a weekly basis. Syndromic Surveillance data will also be used to describe trends during the WNV season.
7. Use aberration detection methods to show unusual patterns of occurrencesDisseminate information by the following media: routine surveillance reports, such as MMWR of CDC, monographs, and state annual reports, peer review journal publications, DOH website and presentation at conferences and other national meetings





## Acknowledgements & Contact Information

### ACKNOWLEDGEMENTS

The Department of Health would like to acknowledge the following distinguished organizations and individuals for their strong support, contribution and participation in the development of this Plan:

Centers for Disease Control and Prevention  
The Metropolitan Washington Council of Governments  
The National Park Service  
The National Zoological Park  
The United States Army Center for Health Promotion and Preventive Medicine  
The United States Department of Agriculture/ Wildlife Services

#### The Department of Health's West Nile Virus/Arbovirus Surveillance Program Working Group:

Robert B. Vowels, MD, MPH	Chairperson & Assistant Senior Deputy Director, EHSR
Karyn Berry, MD, MPH	Interim Senior Deputy Director, Primary Care & Prevention
Kenneth Campbell	DOH Agency General Counsel
John Davies-Cole, PhD, MPH	Chief, Bureau of Epidemiology & Health Risk Assessment
Robert Hamilton, PhD	Program Manager, Pesticide Control Program
Jamie Hinson	West Nile Virus Coordinator
Cecilia Keller, MPH	Acting Chief, Bureau of Community Hygiene
	West Nile Virus Program Manager
Maurice Knuckles, PhD, MSPH	Director, Public Health Laboratory

#### Other Distinguished Contributors:

Theodore J. Gordon	Senior Deputy Director
Walter Fagget, MD	Interim Chief Medical Officer
Daniel R. Lucey, MD, MPH	Special Advisor to the Director for Bio-Preparedness
Brenda Kelly	Chief, Policy, Planning, and Program Evaluation, EHSR

### CONTACT INFORMATION

For further information, visit the Department of Health website at <http://www.dchealth.dc.gov> and click on the West Nile Virus button, or contact:

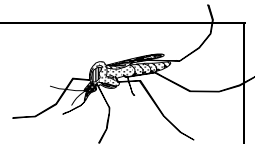
Cecilia Keller  
Program Manager, West Nile Virus Program  
51 N Street, N.E., 6<sup>th</sup> Floor  
Washington, DC 20002  
Phone: (202) 535-2323  
Email: [peggy.keller@dc.gov](mailto:peggy.keller@dc.gov)

#### **For Customer Service Requests**

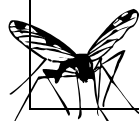
Call the West Nile Virus Call Center at (202) 535-2323

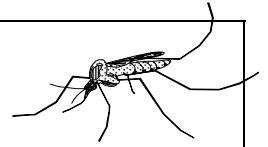






## **APPENDIX A WNV PHYSICIAN'S ALERT**





## APPENDIX B

### MAMMAL SURVEILLANCE FORM

#### GOVERNMENT OF THE DISTRICT OF COLUMBIA

Department of Health

Bureau of Community Hygiene  
Animal Disease Prevention Division



April 15, 2004

TO: District of Columbia Practicing Veterinarians

SUBJECT: West Nile Virus (WNV) Update

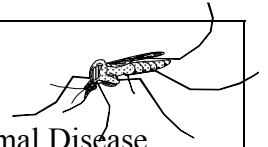
In anticipation of the upcoming West Nile Virus (WNV) season in our area, we are updating the following information to assist you in identifying, testing and reporting West Nile virus cases.

**Surveillance and control plans:** The District of Columbia Department of Health has developed an Arbovirus Surveillance and Response Plan for the year 2004. This plan outlines WNV surveillance for humans, birds and mammals, and mosquitoes. The plan also provides a prevention, control, and response program for WNV for the District of Columbia. The plan as well as prevention and control measures, periodic health alerts and weekly surveillance reports are available on the Department of Health website at [www.dchealth.dc.gov](http://www.dchealth.dc.gov). Clients should be advised to apply the same general guidelines proposed for people to their pets to reduce the chance of their pet's exposure to West Nile virus.

**Reporting and testing of ill animals:** In animals ill with encephalitis that you may encounter in your practice, rabies is still a more likely diagnosis than WNV, and is a more critical diagnosis in regards to rapid provision of preventive treatment to persons exposed. If rabies is suspected and exposures have occurred, such as a bite or other human contact with the animal's saliva, the animal must be euthanized and submitted for rabies testing. That submission should be coordinated with the Department of Health. For horses from a WNV affected area that test negative for rabies, the Laboratory will subsequently test the brain specimens for WNV. Routine WNV testing of the brains of additional rabies-negative animals may be arranged depending on resources and priorities.

Clinical disease and transmission caused by WNV infection in dogs and cats was documented in 2002. Clinical case criteria that have been helpful in narrowing down human encephalitis cases for WNV testing include fever, altered mental status, muscle weakness by neurologic exam or EMG, and abnormal CSF with increased protein, pleiocytosis, and lymphocytosis. Animals ill with encephalitis that do not require euthanasia and rabies testing and are from WNV affected areas may be tested for WNV. The District of Columbia Public Health Laboratory will conduct serologic and virus isolation testing for WNV. Because rabies is a more likely diagnosis in small companion animals, and pets are





unlikely to become clinically ill with WNV, please consult with Department of Health Animal Disease Control Division if you have questions regarding sample submission criteria.

For encephalitis cases in domestic animals/livestock, Department of Health, Animal Disease Prevention Division must be consulted before submitting samples. Samples collected for antibody detection should be collected in red top (clot) tubes and should be paired samples. Virus isolation has, to date, been successful with brain, spinal cord, and kidney.

**Prevention:** Efforts should be directed to minimize exposure to mosquitoes. The single most important control effort should be to eliminate or minimize mosquito breeding habitat near dwellings or stable areas. Clients should be directed to police their areas for cans, tires, clogged gutters or other items which hold standing water that can be used as breeding sites for mosquitoes. This includes swimming pools that are not opened and not maintained in good condition. Water troughs and water dishes should be kept in good condition, water changed every three days, and maintained such that they do not become breeding sites for mosquitoes. By minimizing breeding sites of the WNV carrier mosquito, the number of adult mosquitoes and potentially virus positive mosquitoes that interact with mammalian hosts can be decreased.

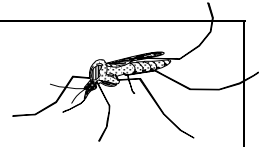
In addition to decreasing the number of breeding sites for the vector, keeping animals in during dawn and dusk when *Culex spp.* is most active may decrease exposure to this mosquito species that prefers to feed in twilight. Insect spray may be effective for short periods of time, but will not have a lasting effect.

### **Summary:**

The risk of acquiring WNV infection from horses or other mammals as a clinician examining these animals is un documented. WNV is vector-borne, however it is prudent to practice universal precautions when handling animals with neurologic signs, especially since rabies, a differential rule-out, can be transmitted directly from an infected animal.

For further questions and submission criteria, please call the District of Columbia Department of Health, Animal Disease Prevention Division, 202-535-2323.





## APPENDIX C

# "Vector-Borne Infectious Diseases Control Emergency Act of 2004"

AN ACT

IN THE COUNCIL OF THE DISTRICT OF COLUMBIA

To establish procedures for the control of public health nuisances relating to vector-borne infectious diseases including prohibiting certain activities that increase the probability that standing, untreated water could develop on a property and create a public health nuisance, authorizing the Mayor to inspect property to determine whether a public health nuisance exists, authorizing the Mayor to take corrective action to abate a public health nuisance, establishing a fund to cover the costs of corrective actions to abate public health nuisances, providing penalties for violations of this act, and requiring the Mayor to issue rules to implement this act, and to repeal unnecessary regulations pertaining to standing water on property.

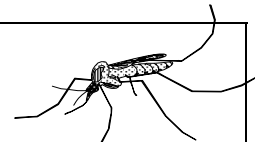
BE IT ENACTED BY THE COUNCIL OF THE DISTRICT OF COLUMBIA, That this act may be cited as the "Vector-Borne Infectious Diseases Control Emergency Act of 2004".

### Sec. 2. Definitions.

For the purposes of this act, the term:

- (1) "Abate" means to eliminate a public health nuisance, or to reduce the degree or intensity of a public health nuisance.
- (2) "District" means the District of Columbia.
- (3) "Person" means any individual; partnership; corporation, including a government corporation; trust association; firm; joint stock company; organization; commission; the District or federal government; or any other entity.
- (4) "Property" means land, including any water thereon, and improvements to land.
- (5) "Public health nuisance" means:
  - (A) Any property, including water, that supports the development, attraction, or harborage of vectors;
  - (B) Any property that has a vessel, container, or other structure holding water that provides a breeding place for vectors; or
  - (C) Any activity that supports the development, attraction, or harborage of vectors, or that facilitates the introduction or spread of vectors.
- (6) "Vector" means any animal capable of transmitting the causative agent of human or animal disease or capable of producing human discomfort or injury, including mosquitoes, flies, mites, ticks, or other arthropods.





### Sec. 3. Prohibited activities.

#### (a) No person shall:

- (1) Cause or allow the open dumping of any tire;
- (2) Cause or allow the open burning of any tire;
- (3) Cause or allow the storage of any tire unless the owner or operator of the property where the tire is stored takes measures to prevent the tire from accumulating water by covering or altering the tire; or
- (4) Cause or allow a tire to be used in playground equipment unless the tire is altered to prevent the accumulation of water.

(b) No person shall cause or allow standing water on property unless the person takes measures to prevent the breeding or harborage of vectors, including the following:

- (1) Draining or replacing water frequently enough to prevent vector breeding;
- (2) Covering water-bearing containers with fine netting to prevent access by vectors; or
- (3) Applying larvicide to the standing water.

### Sec. 4. Inspection.

- (a) The Mayor, acting on the Mayor's own information or observation, or on the information or observation of another person, may inspect occupied or vacant property to investigate an allegation of a public health nuisance.
- (b) Upon the presentation of appropriate credentials to the owner or occupant of the property, the Mayor shall conduct the inspection during reasonable times and in a reasonable manner.
- (c) If the owner or occupant of the property denies the Mayor access for the purposes of this section, the Mayor may apply to a court of competent jurisdiction for a search warrant.
- (d) If, as a result of an inspection, the Mayor determines that a public health nuisance exists, the Mayor may order the owner or occupant to take appropriate action to abate the public health nuisance in accordance with section 6.

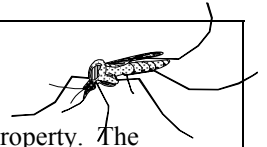
### Sec. 5. Prima facie evidence of a public health nuisance.

The presence of vectors in their developmental stages on a property, or in a vessel, container, or other structure on a property, shall be prima facie evidence of a public health nuisance.

### Sec. 6. Abatement of a public health nuisance.

- (a) When the Mayor determines that a public health nuisance exists on a property, the Mayor shall issue a notice





of violation to the person alleged to have created the public health nuisance or the owner or occupant of the property. The Mayor may serve the notice of violation on the owner, occupant, or any other responsible person at the premises, deliver the notice of violation by prepaid mail, return receipt requested to the owner or occupant of the property, or post the notice in a conspicuous place on the property in violation. The notice of violation shall include the following:

- (1) The location, date, and time that the public health nuisance took place or that the Mayor investigated the public health nuisance;
- (2) The nature of public health nuisance;
- (3) The time, not later than 10 days, within which the public health nuisance shall be abated;
- (4) The specific corrective actions the owner or occupant shall take to abate the public health nuisance; and
- (5) A statement that failure to abate the public health nuisance shall constitute a violation of this act, with each day of violation consisting of a separate offense.

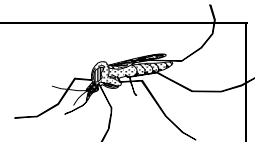
(b) Upon receipt of a notice of violation, the person responsible for the property shall abate the public health nuisance within the time specified in the notice of violation. The Mayor may grant additional time to abate the public health nuisance upon a request from the responsible person and a good faith showing that the person has made an effort to abate the public health nuisance and that a longer time for abatement is necessary.

#### Sec. 7. Corrective actions by District to abate a public health nuisance.

- (a) Subject to the availability of appropriations, the Mayor may undertake actions to correct certain health hazards that have resulted from the development, attraction, or harborage of vectors, including cleanup, abatement, and preventive measures, if the following conditions exist:

- (1) The District needs to take an action in order to protect human health; and
- (2) One or more of the following conditions exist:
  - (A) The action is required to protect public space;
  - (B) No person can be found who is the owner of the property in question, and is capable of proper implementation of the required corrective action within 30 days of the posting of notice on the property in question that violation of this act has occurred, or shorter period, if so determined by the Mayor, as may be necessary to protect human health;
  - (C) A situation exists that requires immediate action by the Mayor to protect human health;or
  - (D) The responsible party has failed or refused to comply within 30 days of a mayoral order





for compliance.

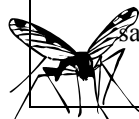
- (b) If the District incurs costs for undertaking any corrective or enforcement action to abate development, attraction, or harborage of vectors, all parties found to be liable by the Mayor shall be jointly and severally liable to the District government for the costs incurred by the District. In addition to any other enforcement action, the Mayor may assess any reasonable costs for correcting the condition and any related expenses as a tax against the property, carry the tax on the regular tax rolls, and collect the tax in the same manner as real estate taxes are collected.

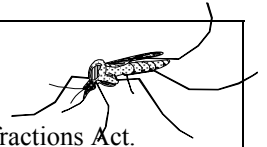
#### Sec. 8. Vector-Borne Infectious Diseases Control Fund.

- (a) There is established the Vector-Borne Infectious Disease Control Fund ("Fund") as a nonlapsing, revolving fund, to be administered by the Mayor as an agency fund as defined in section 373(2)(I) of Title 47 of the District of Columbia Official Code, to be used exclusively for the purposes stated in subsection (b) of this section.
- (b) Disbursements from the Fund may be used by the District to undertake actions to correct certain public health hazards that have resulted from the harborage of vectors, including cleanup, abatement, and preventive measures, in accordance with section 7(a), and to cover the administrative and operational costs incurred by the District in the implementation of the corrective actions.
- (c) The Fund shall be financed through fines, civil penalties, costs and judgements recovered, and monies received as reimbursement by the District government pursuant to this act and regulations promulgated by the Mayor.
- (d) The Fund shall be accounted for under procedures established pursuant to subchapter V of Chapter 3 of Title 47 of the District of Columbia Official Code.
- (e) Nothing in this section shall be construed to make the District government responsible for corrective action costs to any person in excess of the monies in the Fund.

#### Sec.9. Penalties.

A violation of this act or the rules issued under authority of this act shall be a civil infraction for the purposes of the Department of Consumer and Regulatory Affairs Civil Infractions Act of 1985, effective October 5, 1985 (D.C. Law 6-42; D.C. Official Code § 2-1801.01 *et seq.*) ("Civil Infractions Act"). Civil fines, penalties, and fees may be imposed as sanctions for any infraction of the provisions of this act, or the rules issued under authority of this act, pursuant to Titles I-





III of the Civil Infractions Act. Adjudication of any infraction shall be pursuant to Titles I-III of the Civil Infractions Act.

Sec. 10. Rules.

The Mayor, pursuant to Title I of the District of Columbia Administrative Procedure Act, approved October 21, 1968 (82 Stat. 1204; D.C. Official Code § 2-501 *et seq.*), shall issue rules to implement the provisions of this act.

Sec. 11. Repealer.

Subsections 106.1 and 106.2 of Title 22 of the District of Columbia Municipal Regulations (Public Health and Medicine) are repealed.

Sec. 12. Fiscal impact statement.

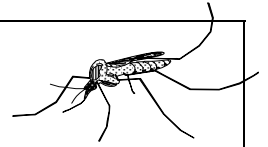
The Council adopts the fiscal impact statement in the committee report as the fiscal impact statement required by section 602(c)(3) of the District of Columbia Home Rule Act, approved December 24, 1973 (87 Stat. 813; D.C. Official Code § 1-206.02(c)(3)).

Sec. 13. Effective date.

This act shall take effect following approval by the Mayor, (or in the event of veto by the Mayor, action by the Council to override the veto), a 30-day period of Congressional review as provided in section 602(c)(1) of the District of Columbia Home Rule Act, approved December 24, 1973 (87 Stat. 813; D.C. Official Code § 1-206.02(c)(1)), and publication in the District of Columbia Register.







## **APPENDIX D**

### **TIRE ROUNDUP CAMPAIGN**

#### **Purpose:**

To eliminate potential mosquito-breeding sites by removing discarded tires that serve as reservoirs for water and to develop a program to recycle collected tires.

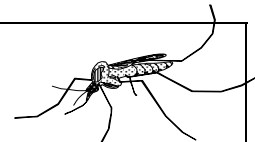
The District of Columbia invests considerable resources to support recycling as a way to protect our environment. By bringing products manufactured from scrap tires "full-circle" back to the community, people can see the results of everyone's recycling efforts.

This pilot project will highlight ways in which recycled scrap tire products can be used in the improvement of community facilities such as playgrounds, parks, buildings, walkways, arenas, etc. There are increasing opportunities for communities to use and benefit from the growing range of tire-recycling products. The project will provide an opportunity for community groups to observe and assess the value of using recycled scrap tire products.

#### **Actions:**

1. Develop and finalize plan to collect tires from residents at one location, such as, RFK Stadium, for recycling. Through educational outreach efforts, residents will be requested to bring their old tires to the collection site.
2. Coordinate with Department of Public Works, DPW, to remove tires from resident homes and transport to collection site.
3. Prepare Statement of Work for Office of Contracting and Procurement, OCP, to seek a qualified vendor to develop a tire-recycling program at one location.
4. Develop Public-Private partnerships with stakeholders to collect and recycle tires.
3. Coordinate with other agencies, such as DCRA, for a multi-agency plan.



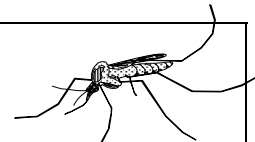


## APPENDIX E

### OUTREACH AND EDUCATION SEASONAL MESSAGE

Pre-Season (April-May)	Mid-Season (June-July)	Late Season (Aug-Sept)
<p>Messages</p> <ul style="list-style-type: none"> <li>♦The DC DOH is Prepared</li> <li>♦Mosquitoes can carry disease</li> <li>♦Clean up standing water around your home</li> <li>♦Persons over age 50 are at higher risk for serious illness from WNV</li> <li>♦DC DOH will not be collecting birds this season</li> </ul> <p>EMPHASIS: Eliminate standing water and potential mosquito breeding sites</p>	<p>Messages</p> <ul style="list-style-type: none"> <li>♦Continue Pre-Season messages</li> <li>♦The DC DOH is working to Protect YOU</li> <li>♦Wear personal protection, bug spray with DEET when outdoors</li> <li>♦Risk from WNV is increasing as mosquitoes start to appear</li> <li>♦Dead birds need to be disposed of in double plastic bags</li> </ul> <p>EMPHASIS: Eliminate standing water and potential mosquito breeding sites</p>	<p>Messages</p> <ul style="list-style-type: none"> <li>♦Continue Pre and Mid Season messages</li> <li>♦Mild, flu-like symptoms are not dangerous, if you have headache with high fever, disorientation and muscle pain with weakness, seek medical attention</li> <li>♦Other animals can become infected, contact your veterinarian if you have particular concern about a domestic or farm animal</li> </ul> <p>EMPHASIS: Eliminate standing water and potential mosquito breeding sites</p>





**APPENDIX F**

**WORK PLAN FOR  
MOSQUITO ARBOVIRUS  
DISTRICT OF COLUMBIA COLLABORATIVE  
SURVEILLANCE PROGRAM  
May 2004**

**I. Purpose**

To assess the threat of West Nile virus (WNV), malaria and other arboviruses in the District of Columbia by determining the presence, distribution, and relative abundance of potential vector mosquito species and to test collected material to determine the presence of arborviral pathogens. This information will be used to guide public health protection activities.

**II. Participants**

Principal agencies include: the DC Department of Health (DCDOH); National Park Service (NPS), National Zoological Park, Smithsonian Institution (NZP,SI); US Army Center for Health Promotion and Preventive Medicine-North (USACHPPM-North); and DoD facilities in Washington DC. Selected points of contacts (POCs) are provided in enclosure 1.

**III. Schedule**

Period	Activity
April 7 – 11	Inventory and Test all Trapping Equipment and Order Supplies (including pesticides)
April 7 - June 5	Initial Larval Survey and Control
May 7-8	Training in Mosquito ID and Trapping Methods
May 19 – Oct 30 (or first killing frost)	Adult Mosquito Trapping and Data Submission
July 7 – Aug 23	Follow-up Larval Surveillance and Control
April 10 – Oct 30 (or first killing frost)	Compile and Catalog all Field Data in GIS

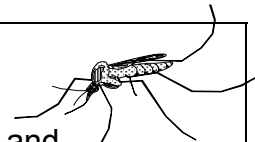
Table 1.

**IV. Mosquito Collection**

**A. Larval Surveillance**

**1. Background** – Larval surveillance shall be conducted by visual examination through the use of a dipper and/or the use of improvised suction devices (e.g., modified hand powered bilge pump) in small water-holding cavities. Presence or absence of larvae shall be determined. Field notes shall include: surveyor, date, location, larval presence/absence, and treatment (if done). Relative abundance of larvae can be recorded by standardizing the number of dips (e.g., 5 per site). If larval identification is not possible then this should be noted. Emphasis will be placed on immediate treatment if possible and if appropriate. Treatment may consist of removing debris from a culvert, turning over a wheelbarrow, or





straightening a wrinkled tarp. In certain circumstances larvae can be collected and returned to laboratory for rearing and identification.

**2. Techniques** - There are several recommendations for successful dipping. Larvae are sensitive to water movement and change in light intensity (e.g., your shadow) and will quickly hide if so disturbed. The dipper should be directed at making a quick but gentle sweep at the water surface. Place the dipper at an angle as it enters the water so that surface water enters the cup. Continue sweeping across the water surface until the cup is one-half to three-quarters full. Avoid filling the cup all the way because larvae could escape before the dipper is righted and removed from the water. Larvae that are disturbed from the water surface will escape to deeper water, resurfacing only when air is needed. Pausing between dips or changing dipping locations will encourage larvae to resurface. If there is vegetation in the water, try dipping where the water meets the leaves or stems. In this case, do not sweep the dipper. Slowly enter it into the water so that water is sucked out of the vegetation into the dipper.

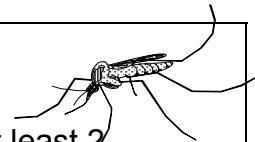
**B. Adult Surveillance** – Adult surveillance shall be conducted through the use of gravid traps, CDC Light Traps augmented by dry ice, and Co<sub>2</sub> generating Propane Traps (Mosquito Magnet<sup>TM</sup>). Additionally Ovitrap shall be used to determine the presence of container breeding potential vectors, but reared adults from these cups will not be routinely tested for pathogen presence. Trap descriptions, advantages and disadvantages are presented in Enclosure 2.

**1. CDC Gravid Traps** – The gravid mosquito trap is single most important tool to assess WNV in the mosquito population. The gravid trap traps and collects female mosquitoes that have recently taken a blood meal and are ready to lay eggs, which in turn greatly increases the probability of detecting the virus, if it is present.

**a. Placement.** Locate the trap in or near residential areas in order to collect container-breeding *Culex spp.*. Traps should be located in areas protected from extreme environmental conditions (e.g., wind and direct sun) and in secure areas (not conspicuous) where they are not disturbed or vandalized. Appropriate trap sites include: utility yards, window wells, stairwells, storm drains, boatyards, animal stables, transformer pits, cluttered backyards, tire storage yards, sewage treatment plants, near garden plots, and cemeteries. It is desirable to have some type of overhead cover (e.g., shrubs or overhangs) so that the tub is not easily flooded in the event of rain. Locate traps where they can be visited daily. If after several visits the trap does not appear productive, move it to an alternate location. The primary goal is to collect blood-fed female mosquitoes. Greater yield per trap is a greater priority than consistent sites that may have poor yields. Traps should be spaced more than 150 feet apart. If trapping at least two consecutive nights, set traps in the morning and, at the same time the next morning, collect the mosquitoes from the trap and switch the battery as preparation for the next trap night. This saves one trip back to the trap but may expose some early –trapped mosquitoes to the mid-day sun. If trapping only one night, set trap out in mid to late afternoon and pick up early the next morning. This avoids trapped material from being exposed to high-noon temperatures.

**b. Setup.** If using the trap for the first time, season the plastic tubs to rid them of insect repellent properties associated with chemical components found in some plastics, and





can be accomplished by immersing the tubs in a muddy pond for several days. At least 2 days before trapping, mix, in a gallon jug or jerry can, at least 1 cup of rabbit pellet food or horse feed alfalfa cubes (available from pet or feed stores) per 1 gallon of aged water. Let the concentrate incubate in a protected (inaccessible to mosquitoes) location. At the trapping site put approximately 1/4 gallon of the premixed rabbit food concentrate to the tub and add aged water collected from a nearby natural source (e.g., pond or stream) or brought along with you, to bring the water level up to within 2 inches of the bottom edge of the fan housing tube. Position the trap bracket securely over the center of the tub and slide the collection bag over the top of the trap tube. Be sure the bag is not askew and that it remains properly positioned, even if breezes pick up. Attach the battery to the terminal wires and make sure it is securely positioned, and test the trap making sure the fan turns freely and draws the air from below. Note: the fan will spin in the wrong direction if polarity is reversed. Assign the trap a number and note its location on a map or GPS mapping system.

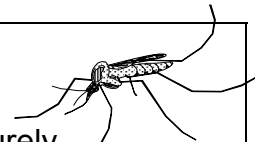
**c. Servicing.** Visit the trap in the early AM so caught specimens do not cook. Carefully remove the trap bag containing mosquitoes and replace with an empty one. Tie off the open end, and if the bag is not easily hung in the servicing vehicle, place net props (e.g., tongue depressors) around the bag so that it does not collapse and the mosquitoes are not crushed. Note in a field notebook the general number of mosquitoes taken from each particular trap (to be verified later in the laboratory) and any other relevant information. The water can be used for multiple trap nights within a week (top it off with aged water to make up for evaporation), but dump the water, where it will evaporate, at the conclusion of one week of trapping and repeat procedure. If this is not done, eggs potentially laid could hatch thereby contributing to mosquito breeding in the vicinity. (Note: prior to emptying water, water surface can be examined for the presence of eggs and, if present, collected in specimen jars for rearing and species confirmation.

**2. CDC Light Traps.** The miniature light trap collects primarily host-seeking female mosquitoes. The addition of a carbon dioxide (CO<sub>2</sub>) attractant (e.g. dry ice) substantially increases the number and species diversity of collected mosquitoes and is, therefore, essential.

**a. Placement.** Locate the trap in generally moist areas (near ponds, swamps, cattail marshes, creeks, wet fields, storm drains, culverts, or flooded woods), protected from the wind. Generally wood margins are good because of the diversity of habitat. In urban environments, place the traps near shrubs, refuse areas, cluttered back yards, cemeteries, and woods. Place in secure areas (not conspicuous) and where they will not be disturbed or vandalized and **make sure there are not competing light sources**. This can best be verified by visiting potential sites at night. Locate traps where they can be visited daily. If after several visits, the trap does not appear productive, move it to an alternate location. Traps should be spaced more than 150 feet apart. If trapping at least two consecutive nights, set the trap out in the morning, and, at the same time the next morning, pick-up trap material and switch battery in preparation for the next trap night. This saves one trip back to the trap but may expose some early-trapped mosquitoes to the mid-day sun. If trapping only one night, place trap out in mid to late afternoon and pick up early the next morning. This avoids trapped material from being exposed to high-noon temperatures.

**b. Setup.** Hang trap approximately 7 feet off the ground. Using a bent wire coat hanger between a tree limb and trap speeds up the set up and marks a consistent





attachment point. Attach the battery to the terminal wires and make sure it is securely positioned, and test the trap making sure the fan turns freely and draws the air from below. If there are dipswitches controlling bulb and fan activation, make sure it is set to run during light and dark periods so that daytime biters (e.g., *Aedes albopictus*) will be captured. Note: the fan will spin in the wrong direction if polarity is reversed. Fill an insulated container holding 2-3 lbs. of commercial chunk dry ice and hang it directly above or right next to the trap. Assign the trap a number and note its location on a map or GPS mapping system.

**c. Servicing.** Visit the trap in the early morning so collected specimens do not cook.

Carefully remove the trap bag containing mosquitoes and replace with an empty one. Tie off the open end, and if the bag is not easily hung in the servicing vehicle, place net props (e.g., tongue depressors) around the bag so that it does not collapse and the mosquitoes are not crushed. Note in a field notebook the general number of mosquitoes taken from each particular trap (to be verified later in the laboratory) and any other relevant information.

**3. Propane-Generated CO<sub>2</sub> Traps** (e.g., Mosquito Magnet<sup>TM</sup>) can collect large numbers of day or nighttime biting mosquitoes. Uses CO<sub>2</sub>, heat, and a chemical lure (octonol) to capture a variety of mosquito species.

**a. Placement.** Locate the trap in a secure area where theft is not possible (these traps are expensive). Generally place in the same location as CDC light traps. Competing light sources are not a problem. Locate traps where they can be visited daily. Even though these traps run continuously, trap bags should be removed frequently because specimens dry out. If after several visits the trap does not appear productive, move it to an alternate location. Traps should be spaced more than 150 feet apart (refer to manufacturer's instructions).

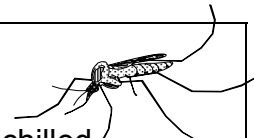
**b. Setup.** Indicate in field records if octonol (synthesized ox breath) lure is being used. Refer to trap directions for starting catalytic converter and safely running trap. Assign the trap a number and note its location on a map or GPS mapping system.

**c. Servicing.** Even though these traps run continuously, trap bags should be removed frequently (several times per week) because specimens will dry out and turn brittle. Carefully remove the trap bag containing mosquitoes and replace with an empty one. Tie off the open end, and if the bag and hang or prop up the bag in the servicing vehicle so that it does not collapse and the mosquitoes are not crushed. Note in a field notebook the general number of mosquitoes taken from each particular trap (to be verified later in the laboratory) and any other relevant information.

## V. Specimen Processing

Do not expose mosquitoes to direct sunlight or extreme temperatures (e.g., enclosed vehicle). The mosquitoes must be fresh for viral testing. Captured mosquitoes can be transferred from the net bag to a more compact handling container (e.g., paper ice cream container with a rubberized aperture) using a battery-powered aspirator or HEPA-protected oral aspirator. Upon return to your processing facility, place the handling container or entire bag containing mosquitoes in a normal freezer (< 32 degrees F) for at least 30 minutes [ultra





low freezer (-60 degrees F) – at least 15 minutes). Empty frozen mosquitoes on a chilled surface (chill table or enamel pan nested in an ice bath) examine with a hand lens or dissecting microscope. Mosquitoes should be handled carefully and promptly. As mosquitoes dry they become brittle and legs/body parts break off. It is advisable to have a fresh, clean sheet of paper underneath the contents of each trap. Also, forceps should be wiped clean between each filling each pooling tube. First remove all non-mosquitoes. Next separate all male mosquitoes and note the number in the data sheet remarks section (but do not pool). Either discard or save the males for your own reference purposes. After all non-mosquito and male specimens are removed, females are then placed in vials as a group (pool) of 1 to 25 specimens of the same genus or species, which were collected from the same trap. If expertise is available, sort to species. For West Nile virus, members of the genus *Culex* will be given priority for pooling. In particular the *Culex* species listed in Table 2 (below) that occur in the DC area. The urban container breeding and/or non-native species *Aedes aegypti*, *Ae. albopictus* and *Ochlerotatus japonicus* merit examination as well and should be pooled if collected. For malaria, the *Anopheles* mosquitoes are the vectors and will be tested for this pathogen. If expertise in species identification is not available, sort to the best of your ability. Package and ship specimens IAW viral assay protocol. Record all required data and make sure pool vials are clearly labeled. A list of mosquito species that have tested positive in the field is provided in Table 2. Species with an asterisk (\*) do not normally occur in the District of Columbia.

### WNV-Positive Mosquito Species Reported, United States, 1999-2002\*

<i>Culex</i>	<i>Aedes</i>	<i>Ochlerotatus</i>	<i>Anopheles</i>	Other
<i>pipiens</i>	<i>albopictus</i>	<i>atlanticus</i>	<i>atropos</i> *	<i>Cs. melanura</i>
<i>quinq.</i>	<i>aegypti</i>	<i>atropalpus</i>	<i>barberi</i> *	<i>Cs. inornata</i>
<i>tarsalis</i>	<i>cinereus</i>	<i>canadensis</i>	<i>crucians</i>	<i>Cq. perturbans</i>
<i>restuans</i>	<i>vexans</i>	<i>cantator</i>	<i>puncitpennis</i>	<i>Deinocerites cancer</i> *
<i>salinarius</i>		<i>japonicus</i>	<i>quadrimac.</i>	<i>Ps. columbiae</i>
<i>nigripalp.</i> *		<i>sollicitans</i>	<i>walkeri</i> *	<i>Ps. ciliata</i>
<i>erraticus</i>		<i>taeniorhynchus</i>		<i>Ps. ferox</i>
<i>territans</i>		<i>triseriatus</i>		<i>Orthopodomyia signifera</i>
		<i>trivittatus</i>		<i>Uranotaenia sapphirina</i>

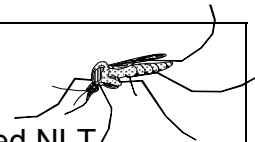
\* Reported as of 01/21/2003 – 36 species

Table 2.

## VI. Trapping Frequency/Weekly Schedule/Timing

Ideally the traps at any trap site should be run **two nights per week**. It is best to trap at the beginning of the week; Monday, Tuesday (and/or Wednesday), to allow time for sorting and express mailing specimens before the weekend. This also allows for adjustments if there is some reason you can't trap on a given night (e.g., storms, holidays). Remember, the





attractant concentrate needs to incubate for at least 2 days, so it should be prepared NLT **THURSDAY** of the prior week. If trapping at least two consecutive nights, set the trap in the morning, and then, at the same time the next morning, pick-up trap material and switch battery in preparation for the next trap night. This saves one trip back to the trap but may expose some early-trapped mosquitoes to the noon-day sun. If trapping only one night, set trap in mid to late afternoon and pick up early the next morning. This avoids trapped material from being exposed to high-noon temperatures.

1.

## VII. Trapping Scheme

There will be approximately 40 sites being sampled throughout the season. A **site** can contain one or more traps (several of the military properties have more than 6 traps at a site). The traps at a particular site can be of different types. Individual trap locations should remain relatively constant. If a trap is unproductive after a few weeks, it should be moved to another location. If this is done, **give the newly located trap a new identification code or number** (and add coordinates to your GPS mapping system). Ideally the trap sites near wooded wet areas (e.g., C&O Canal, Potomac River, Anacostia River, woodland ponds/streams) should have at least one gravid and one CDC light trap or a Mosquito Magnet. This is because the gravid trap will not normally catch *Anopheles* spp mosquitoes (Malaria vector) but the others will. Although not distributed on a strict grid pattern, the trap sites are spaced with care to provide uniform coverage. Considering the total number of traps used (remember, more than one trap can be at a site) there will be at least one trap per square mile within the District.

## VIII. Sample Transport to Lab for Testing

Collected specimens shall be overnight shipped to the DC Public Health Lab or delivered to the lab, by arrangement, on a weekly basis. If samples are to be hand-delivered, please call the lab in advance to get information on security requirements. Samples should be in an insulated box or cooler with several chill packs (not dry ice).

## IX. Data Reporting

Mosquito collectors should enter pooling data on a standard data sheet. A data sheet must accompany all submitted specimens. Once specimens arrive at the Lab, they will be logged in, reviewed, and tested. A weekly report will be transmitted by e-mail to all collaborators.

## X. Information Technology (IT)

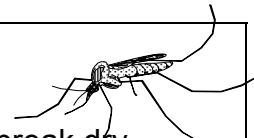
Data generated from this project will be used, by agreement, for geo-information purposes including Remotely Sensed Epidemic Surveillance (RSEPIs), and Epidemic Surveillance Database (ESDB) projects. This is research headed by Dr. James Wilson, Georgetown University Medical College.

## XI. Personal Safety

Personal safety should be a priority throughout the project duration. It is best to travel in teams of 2 to trap sites. A mobile phone for field personnel is recommended. Do not










transport dry ice in a closed vehicle. Do not handle dry ice without gloves. Do not break dry ice blocks without wearing safety glasses. Wearing light colored, long sleeve shirts and long pants is advisable to reduce the potential of being bitten by daytime mosquito biters and to detect and remove ticks on clothing. The use of skin repellent containing at least 30% concentration of DEET and a clothing repellent containing permethrin is encouraged if trapping in an area where daytime biting mosquito species (e.g., *Aedes albopictus*) and/or ticks occur. However measures should be taken to not contaminate traps and equipment with repellent. This is best done by applying repellent while still at the office, and then thoroughly washing hands with soap and water prior to handling traps. Field staff should have personal protective equipment, gloves and a N-95 dust mask at a minimum.

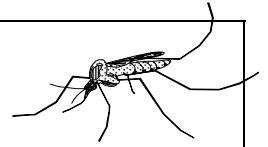
#### SELECTED, COMMERCIALY-AVAILABLE MOSQUITO SURVEILLANCE TRAPS\*

TRAP & DESCRIPTION	PHOTO	ADVANTAGES	DISADVANTAGES
<b>GRAVID TRAP</b> (AKA CDC Gravid trap, Reiter Trap) Plastic basin (14"x10"x7") holding synthetic sewage (e.g., fermented rabbit/horse chow in water), updraft fan in cross-bracketed 3.25"D PVC pipe, net collection bag at top, powered by 6VDC sealed rechargeable battery. Variation includes a tool-box fan/collection canister housing.		Best use: <i>Culex</i> collection for pathogen testing, population density, breeding source determination Selective for large numbers of Gravid (and likely fed) <i>Culex</i> spp, esp. <i>pipiens</i> . Will catch smaller numbers of <i>Ae. albopictus</i> and <i>Och. japonicus</i> Low cost, low tech Few non-targets	Limited species caught Specimens go through fan (not so in the tool box model) If neglected can be breeding source Need advance preparation of synthetic sewage attractant Stinks
<b>CDC LIGHT TRAP W/CO<sub>2</sub></b> (AKA SSAM Trap, CDC Miniature Light Trap, ABC Trap, New Standard Miniature Light Trap) Tubular acrylic or PVC trap body approx. 3.5"DX5" tall, approx. 14"D removable lid, down-draft fan below screen and 4W minibulb, net bag or vented collection canister hangs below, powered by 6VDC sealed rechargeable or 4 D-cell batteries, needs insulated canister for dry ice.		Best use: species composition, population density, pathogen testing, breeding source determination Good for <i>Culex</i> , <i>Culiseta</i> , <i>Coquillettidia</i> , <i>Uranotaenia</i> , <i>Anopheles</i> Diverse mosquito trap catch Compact, light-weight Spare parts readily available	Specimens go through fan Collects non-targets Need CO <sub>2</sub> source (dry ice) Specimens may not have fed (limits value for pathogen testing)
<b>CO<sub>2</sub> GENERATING PROPANE TRAP</b> (AKA Mosquito Magnet, others) Uses counterflow geometry (CFG) collection principle, CO <sub>2</sub> produced catalytically by 20 lb propane tank (some models need 110AC current), maximum dimensions 28"X20"X27.5," collection bag in internal housing, units movable on wheels.		Best use: species composition, pathogen testing, population density Diverse mosquito trap catch, esp. with Octenol lure Specimens don't go through fan Large number of certain species can be caught Can run long time without tending Few non-targets (mainly spiders) No need for dry ice	Relatively pricey, bulky Requires compressed gas Some require AC outlet Some alternate manufacturer's trap versions perform poorly Specimens can dry-out if not removed promptly Specimens may not have fed (limits value for pathogen testing)

\* The first two traps listed, Gravid Trap and CDC Trap w/CO<sub>2</sub>, are time-tested and proven to have the most value in WNV mosquito and viral surveillance, to date. Other traps exist (e.g., CFG Trap, Wilton Trap) but are either not commercially available or little is known about their performance. Specific products or brands mentioned do not imply endorsement by the US Government.

Prepared by B. Pagac, USACHPPM-North, Apr 1 2003 (ben.pagac@na.amedd.army.mil)





## APPENDIX G REGIONAL CONTACTS

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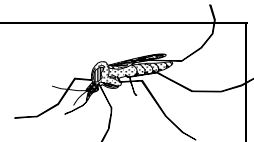
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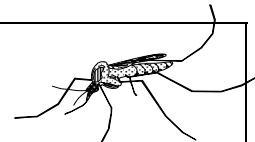
## District of Columbia Department of Health

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# **APPENDIX H**

## **GOVERNMENT OF THE DISTRICT OF COLUMBIA**

### **WEST NILE VIRUS & MALARIA UPDATE**

#### **YEAR END REPORT**

**December 31, 2003**

#### **WEST NILE VIRUS**

West Nile virus is a new disease, labeled as an emerging infectious disease, and only appeared in the eastern United States in 1999. As part of the West Nile virus tracking system, the Department of Health (DOH) conducts human, avian, or bird, mammal and mosquito surveillance and keeps extensive database and spreadsheet records detailing the surveillance. The Department has recently increased lab capacity for surveillance mechanisms of West Nile and other arboviruses. In the last year, there have been three positive<sup>1</sup> cases of West Nile virus in a large part due to the Department's comprehensive outreach and education program and targeted larviciding.

West Nile virus (WNV), a mosquito-borne flavivirus introduced recently to North America, is a human, equine, and avian neuropathogen. The majority of human infections with WNV are mosquito-borne; however, other modes of transmission have been documented over the five years of WNV surveillance in the United States.

Additional routes of human infection became apparent during the 2002 West Nile epidemic. It is important to note that these other methods of transmission represent a very small proportion of cases. Such routes include; transplacental, laboratory acquired infection through percutaneous inoculation, transplanted organs and blood transfusions.

#### **Transplacental**

Evidence of person-to-person transmission was documented from mother to infant (transplacental) through breast milk. WNV genetic material was transiently present in the breast milk of a woman with WNV infection and measurable WNV-specific IgM was detected in her baby. No new cases of transplacental transmission have been reported since 2002.

Based on a 2002 case in Michigan, it appears that West Nile virus can be transmitted through breast milk. A new mother in Michigan contracted West Nile virus from a blood transfusion shortly after giving birth. Laboratory analysis showed evidence of West Nile virus in her breast milk. She breast-fed her infant, and three weeks later, her baby's blood tested positive for West Nile virus.

Pregnant women should take precautions to reduce their risk for WNV or other arboviral infection and should undergo diagnostic testing when clinically appropriate.

#### **Laboratory Acquired**

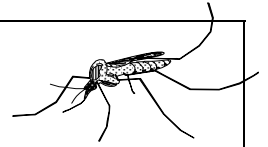
In 2002, two cases of WNV infection in laboratory workers were reported. The workers acquired the infection through percutaneous inoculation and had no other known risk factors. No cases of laboratory-acquired WNV have been reported since October 2002.

Laboratory workers handling fluids or tissues known or suspected to be WNV-infected should minimize their risk for exposure.

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<sup>1</sup> CDC changed definition of "positive" case. Cases may be reported "positive" without confirmatory tests such as neutralization or PCR. Case categories: "positive"; "probable" "pending" and "negative". CDC combines the results of positive and probable into one category





## Transplant Organs and Blood Transfusions

As of September 16, 2003, a total of 489 WNV-viremic blood donors have been reported to ArboNET, the CDC database. Two cases of confirmed transfusion-associated WNV transmission have been identified in 2003. Both patients have recovered.

According to blood collection agencies, approximately 2.5 million blood donations have been screened for WNV since approximately July 2003. Patients receiving needed transfusions or transplants outweigh the potential risk for West Nile virus infection. These findings suggest a need to develop more sensitive screening tests for use in minipool testing, or that individual donation testing (instead of minipool testing) might be considered in areas experiencing a high number of WNV infections, depending on the testing capacity of the Blood Collection Agency.

In 2003, the reported numbers of human and animal infections increased, and the geographic range of WNV activity expanded substantially. These data underscore the need for intensive surveillance to detect and quantify WNV activity in areas where humans are at risk, public education to teach persons how to prevent mosquito bites, and sustained and integrated mosquito-control activities.

The Department of Health has established a West Nile virus Call Center number at 202-535-2323 a health care and question line at 202-442-9196 and extensive web site information at <http://www.dchealth.dc.gov>. In addition, DOH added Health Alerts to the web site, as needed.

The chances of developing the symptoms of West Nile virus from the bite of a mosquito are very remote. Less than one percent of mosquitoes test positive for the virus in areas where the virus is present. And, if bitten by that mosquito, a person has less than a one percent chance that he or she will develop symptoms. Generally, the symptoms are very mild and may not even be noticed. Only in very rare cases will the symptoms be severe. Immune compromised individuals are the population most at risk. Anyone who suspects that they have the virus should contact their doctor immediately.

DOH has trained staff to assist residents with identifying and eliminating potential mosquito breeding sites and to speak at neighborhood meetings and health fairs. The fundamental components of the West Nile virus plan are prevention and protection.

The West Nile virus program is a fluid program that is continually evaluated and altered to protect the public. DOH ceased dead bird surveillance in August of 2002 and increased mosquito surveillance to increase assessment of human risk in the District. It is paramount to track positive mosquito pools and species of mosquitoes testing positive. As a result of this increased mosquito surveillance, new species of mosquitoes have been identified in the District. Mosquito surveillance has unveiled a high population of *Aedes albopictus*. These species are closely associated with humans, are day-time human biters, breed in tires, flower pots and bird baths and cause increased concern. The *Aedes albopictus* is very aggressive and can be hidden in shady, grassy or wooded areas. During surveillance year 2002, *Aedes albopictus* in the District were tested positive. Previously only *Culex pipiens* have tested positive in the District. As a result of the new species testing positive, DOH has added precautions of protecting residents against mosquito bites at all times during the day and not just dusk and dawn.

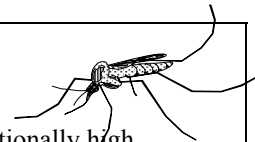
CDC has reiterated that larval control is the most effective control, per Harry Savage in August of 2002.

Through collaboration with the Department of Defense and National Park Services, larval control and mosquito surveillance throughout the District is uniform. Traps are set at designated intervals and collected on a set schedule. This system allows for the most consistent trapping and testing results.

## AVIAN SURVEILLANCE

- DOH established a West Nile virus Call Center at 202-535-2323 that received approximately 10-120 calls per day from the public requesting advice and assistance.





- Effective August 9, 2002, DOH ceased dead bird collection because the rate of positivity was exceptionally high and West Nile virus in birds should be considered endemic in the District. Residents were encouraged to dispose of the birds themselves or call DPW at 202-727-1000 for removal. Specific details instructions for disposal were available on the Department of Health's website [http://www.dchealth.dc.gov/information/fact\\_sheets/westnilevirus.shtm](http://www.dchealth.dc.gov/information/fact_sheets/westnilevirus.shtm) and the Call Center at (202) 535-2323.
- Crows, blue jays and hawks that are viable specimens were sent to the Maryland State lab for testing.
- In 2000, the first positive bird was collected on September 28, with a total of 5 positive birds for the year. In 2001, the first positive bird was collected on July 10, with a total of 360 positive birds for the year. In 2001, 914 birds were collected, 444 were tested and 360 tested positive, with a percent of positivity of 81.08%.
- In 2002, 905 birds were collected, 340 were processed for testing, 31 tested negative, 134 disposed of and 175 birds tested positive, with a rate of positivity of 84.95%.
- In 2001, the vast majority of positive birds were located in the Ward 5 Brookland area.
- In 2002, the epicenter had changed and is located along the Connecticut Ave corridor located near the 3000 block.
- In 2003, select birds were tested by the National Zoological Park and the Department of Defense. Three birds tested positive, however the total number of birds tested has not yet been reported (as of January 1, 2004).

## HUMAN SURVEILLANCE

- DOH staff distributed West Nile virus Physician Alerts by blast fax to health care providers and hospitals detailing the West Nile virus reporting and specimen submission criteria.
- DOH staff contacted hospital infectious disease practitioners weekly to determine if any patients meet the testing and reporting criteria.
- DOH staff prepared, processed, transported and submitted human specimens for testing.
- There were over 20 samples submitted in 2001 and all samples tested negative.
- In 2002, thirty-one cases of human infection were reported positive<sup>1</sup> in the District with two human deaths associated with WNV. The first human death in D.C. associated with WNV occurred on September 9, 2002 in a man receiving treatment for leukemia. The second human death associated with WNV occurred on October 1, 2002 in a woman in a high risk category with a compromised immune system.
- In 2002, 80 samples from District residents were submitted for testing: thirty-one samples were positive, three samples were probable, 28 samples were negative, and 18 samples were pending.
- In 2003, three cases of human infection were reported positive in the District. All patients have recovered. Twenty-five samples tested negative, six were probable and nine are pending (as of January 1, 2004).

## MOSQUITO SURVEILLANCE

- DOH staff set gravid traps, targeting pregnant mosquitoes, throughout the District in all wards in response to reports of positive birds and mosquitoes.
- DOH staff set traps on Mondays and Wednesdays and collected, sorted, prepared for testing and transport on Tuesdays and Thursdays.
- The US Army tested the mosquitoes and assisted the District with trap setting.
- In 2001, DOH and the Army partners such as, Bolling, Fort McNair, Walter Reed submitted 870 pools for testing. Three pools tested positive.
- In 2002, DOH Fort McNair, Walter Reed, Soldier's Home, Bolling, Rock Creek Park and the National Zoo submitted pools of mosquitoes. In 2002, a total of 1,315 mosquito pools were tested, 53 of which tested positive.
- In 2003, 20,684 mosquitoes were collected in the District and sorted into 2,215 pools. Of these, 49 tested positive for WNV. Those species testing positive are the *Culex pipiens*, *Aedes albopictus* and *Aedes aegypti*.

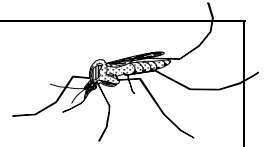
## MOSQUITO CONTROL

- DOH staff larvicided in response to positive birds and mosquitoes and community concerns. The larvicide, a biological product that kills mosquitoes in the larval stage, is placed in catch basins and in areas of standing or

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<sup>1</sup> CDC changed definition of "positive" case. Cases may be reported "positive" without confirmatory tests such as neutralization or PCR. Case categories: "positive"; "probable" "pending" and "negative".





stagnant water.

- In April of 2002, DOH staff began larviciding in the District at locations of positive birds and mosquitoes from 2001 in an eight square block area at each address.
- The larvicide application was repeated approximately every 5-6 weeks.
- Larviciding has been determined to be more effective over a period of time than adulticiding. Mosquito catches were significantly reduced in areas where larviciding efforts were conducted.
- In 2001, DOH staff larvicided 3,496 catch basins.
- In 2002, DOH staff larvicided over 10,835 catch basins.
- In 2003, DOH staff larvicided 3,818 catch basins and areas of standing water throughout the district in response to elevated mosquito populations, positive findings in any surveillance system and citizen concerns.
- The District does not expect to spray for mosquitoes because of low efficacy; kills off non-target species and potential health risks to a high population of persons affected with respiratory problems and compromised immune systems.
- Killing mosquito larva and eliminating mosquito-breeding sites appear to be the most effective measure in reducing the numbers of mosquitoes.
- Research shows that larviciding is far more effective in reducing mosquitoes than spraying over time.

## MAMMAL SURVEILLANCE

- DOH staff has distributed information to vets, pet shops, and horse stable managers detailing reporting and specimen submission criteria and protocol.
- No mammals have tested positive in the last three years.

## OUTREACH AND EDUCATION

- DOH has prepared an informational brochure emphasizing prevention and protection. The brochure has been translated into Spanish, Chinese, Korean and Vietnamese.
- DOH provided information on the DOH website to provide residents with information regarding West Nile virus including Controlling Mosquitoes, CDC questions and answers, recent press releases and the brochures in multiple languages.
- DOH developed an informational script for use in community presentations.
- DOH staff distributed brochures door-to-door to 19,705 residences, and spoken to residents about prevention and protection techniques.
- Brochures were distributed in response to requests by private citizens, day care centers, senior citizen homes, residential housing, hospitals, libraries, schools, parks and recreation centers, churches, other District agencies, NSC Coordinators and all ANC Commissioners. To date, DOH distributed approximately 30,253 brochures in bulk this year.
- DOH staff attended approximately 68 community and core team meetings.
- DOH spokespersons have completed approximately 48 interviews with local and national media to discuss West Nile virus, explained health precautions and promoted prevention and protection techniques. Spokespersons also conducted seven live interviews on national radio, answering listener's call-in questions.

## MALARIA

### MALARIA SURVEILLANCE

Two people have tested positive for malaria in Loudoun County in the Commonwealth of Virginia in September 2002. In response, neighboring jurisdictions tested mosquitoes and reported that 2 mosquito pools in Loudoun County, Virginia; one pool in Arlington County, Virginia; two pools on Seldin Island in Montgomery County, Maryland; and one pool on Van Deventer Island in Montgomery County, Maryland have tested positive for malaria. Only the *Anopheles quadrimaculatus* mosquito carries malaria in the metropolitan Washington area. The DOH mosquito surveillance team has been setting traps to collect and test mosquitoes for malaria in addition to the West Nile virus testing since September 2002. In 2003, DOH and US Army staffs have collected only 33 *Anopheles* mosquitoes (20 pools) out of over 20,000 mosquitoes. All the collected *Anopheles* mosquitoes have tested negative for malaria.

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