

**Metropolitan Washington  
Council of Governments**

**Health Officials Committee**

**West Nile Virus  
Response Plan**

*for the  
National Capital  
Region*



**Mosquito-Borne Pathogens  
Task Force**

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## Acknowledgements & Contact Information

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## West Nile Virus Response Plan for the National Capital Region

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Please direct any inquiries about the *West Nile Virus Response Plan for the National Capital Region* to Sean O'Donnell, at [seanodonnell@mwkog.org](mailto:seanodonnell@mwkog.org) or (202) 962-3707.

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## West Nile Virus Response Plan for the National Capital Region

### Executive Summary

This 2003 West Nile Virus Response Plan (WNVRP) coordinates and describes local efforts to control West Nile virus (WNV) in the COG region. The original 2001 WNVRP addressed the emerging threat of this virus to the region. However, WNV is now endemic. Nationally, the number of human cases of serious WNV infection has grown from 66 cases in 2001 to 4156 cases (and 284 deaths) in 2002. In the COG region there were 73 reported cases last year (with 7 deaths), up from a single case in 2001.

The goal of this plan is to reduce the threat of mosquito species that carry WNV near human populations. Mosquito control measures are listed in the following priority of action:

- 1) Complete draining or removal of standing water at least once per week, where possible.
- 2) Encourage personal protection strategies such as using insect repellent containing DEET, wearing protective (long sleeved, light colored) clothing, and repairing window and door screens.
- 3) Appropriate use of larvicide and natural predators.
- 4) Use of adulticides when necessary.

Local plans for response vary among jurisdictions, however it is universally agreed that the public plays an *essential* role in combating and reducing the threat from West Nile virus. The emergence of the Asian tiger mosquito, which breeds in standing water found primarily in urban and suburban settings, and which is active during the day, adds new emphasis to the breeding site reduction efforts of area citizens on their properties. This plan also provides area residents with website and contact information for their jurisdictional WNV response.

This plan outlines WNV surveillance techniques currently used and sets regional standards for reporting WNV activity in mosquito, avian, equine, and human populations. This plan also contains plans for communication between surveillance, mosquito control and public health officials with respect to WNV activities.

Each local and state jurisdiction will implement mosquito control measures based on: surveillance results of enzootic activity and knowledge of indicated vector species; geography; weather patterns; population proximity and density; and other jurisdictional differences. The plan emphasizes effective measures that have demonstrated the best outcome on resident health and are least invasive to the surrounding.

**A strong partnership between the Public Health sector and the residents of the National Capital Region is the only way to effectively control the spread of WNV in our region.**

## I. Introduction

The *COG West Nile Virus Response Plan for the National Capital Region* describes the regional response to the threat of West Nile virus or other arbovirus outbreaks in the Metropolitan Washington Council of Governments (COG) Region.

In 2001, the original MWCOG West Nile Virus Response Plan addressed the emerging threat of this virus to the region. It outlined risk levels and response activities tied to the identification of West Nile virus infected mosquitoes, avians and humans. However, by 2003, WNV had become endemic to our region with all jurisdictions reporting locally infected human cases. Therefore, this plan was created to reflect current levels of arbovirus surveillance and data tracking, mosquito control, public education and outreach, and communication among the jurisdictions.

Health Officials created the COG Mosquito-Borne Pathogens Task Force in 2003 in order to coordinate local WNV plans and revise the original plan.

This plan is intended for use by: local Health Officials in order to better coordinate their jurisdictional efforts with the rest of the National Capitol Region (NCR); Public Information Officers and Health Departments that will implement public education and outreach; and the general public as a resource on West Nile virus and integrated pest management in the NCR.

For detailed information on individual jurisdictions' programs please review the state plans listed in [Appendices H, I, and J](#), or contact your local jurisdiction's website or health department. ([Appendix F](#))

COG is an independent, nonprofit association composed of 18 local governments surrounding our nation's capital. COG is also supported by its neighboring state and federal governments.

This plan applies to the National Capitol Region (NCR), which is defined as the District of Columbia; Montgomery and Prince George's County in Maryland; Arlington, Fairfax, Loudoun, and Prince William Counties in Virginia; and all cities existing within the geographic area designated by the outer boundaries of these combined counties. For the purpose of this plan, the term *region* is expanded to include Frederick County, Maryland and thus include all COG member jurisdictions.

The COG Mosquito-Borne Pathogen Task Force consists of local and state public health staff representing their jurisdiction's Health Officials, COG staff, and representatives from the Metropolitan Washington Public Health Assessment Center at The George Washington University.

## II. Background

Though known abroad since 1937, West Nile virus (WNV) had not been detected in the United States until August 1999. Concurrent with infections and deaths in wild and exotic birds, 62 people in New York City and surrounding areas became ill and seven people died. In the US, from 1999 through 2001, 149 human cases of confirmed West Nile virus illness were reported to the CDC, including 18 deaths.

The reported numbers of human and animal infections, and the geographic area affected by WNV, expanded substantially in 2002. As of April 15, 2003, the CDC had received reports of 4156 human cases of West Nile virus for the year 2002, including 284 deaths, in 40 states and the District of Columbia (from ArboNet, CDC).

Locally, in 2001 Prince George's County recorded the first and only human case of WNV in the NCR. However, hundreds of infected birds were found throughout the region raising concerns for the following year. As of March 12, 2003, officials documented 73 human cases of WNV with seven fatalities for the year 2002 in the National Capital Region.

These data underscore the increased need for: surveillance to detect and quantify WNV presence in areas where humans are at risk; sustained integrated pest control efforts to reduce the mosquito population; and public education on how to minimize the risk of contracting WNV and other arboviral diseases.

## Surveillance

West Nile virus is most commonly transmitted through the bite of a mosquito. WNV has been identified in humans, birds, horses, certain reptiles and various domestic and wild mammals. In order to respond to the WNV threat to public health and safety, COG jurisdictions have integrated multiple surveillance programs. Although programs vary in the details, their goal is to determine the extent to which WNV and other arboviruses are present in their localities, assess the risk to the population, and determine target sites for effective mosquito control and disease prevention.

Surveillance is one tool in the decision making process that informs the efficient allocation of health resources. It should be used along with the degree of health risk present, the cost effectiveness, and the efficacy of possible actions taken or not taken as a result of the information provided by surveillance.

As WNV becomes more endemic to our region, surveillance protocols will need to adjust. Because surveillance activities are tailored to meet changing local needs and challenges, these activities will differ from one jurisdiction to another as local challenges change.

### III. Mosquito Surveillance

The risk of WNV disease transmission is based in part, upon the presence and population density of identified mosquito carriers. Mosquito surveillance activities involve identifying habitats, mosquito trapping, species identification, determining the population densities of local mosquitoes, and testing mosquito pools for viruses. A mosquito pool is a batch of adult mosquitoes, not larvae from a body of water. Trapped adult mosquitoes are pooled (batched) for testing according to species and collection site and date, in numbers of from 10 to 50 mosquitoes per pool (batch).

**Larval surveillance** is done to determine which aquatic habitats mosquitoes are using for breeding. Larval sampling (dipping) also indicates the size of a local immature mosquito population, the species present, whether immature mosquitoes are at a developmental stage that can be controlled by larvicides, and what habitats need treatment with larvicides. Larval sampling (dipping) requires a certain level of expertise and practice.

**Adult trapping** utilizes many different types of traps to attract a wider variety of mosquito species. Some of the most important traps used include gravid traps and CDC light traps. All local jurisdictions conducting mosquito trapping collect data on trapping method, trap date, trap location, and species collected. Certain mosquito species will be tested for select mosquito-borne viruses and other pathogens.

Mosquito species in the *Culex* genera are among the most important WNV vectors. *Culex pipiens* and *Cx. restuans* are the predominant species transmitting West Nile virus among birds. The most efficient trap to use for them is the gravid trap. *Culex salinarius* and other *Culex* species are more easily collected with CDC light traps.

Although *Aedes Albopictus* breed in standing water pooled on man-made materials, and thus are likely to be found in greater numbers in urban and suburban areas, they are not easily trapped. However, Fay Prince traps, baited with dry ice, and gravid traps baited with certain bait formulations may improve the trapping potential.

*Anopheles quadrimaculatus* mosquitoes, the predominant carrier of malaria, are not readily attracted to traps. They can only be collected in significant numbers by aspiration from their resting shelters during the daytime.

**Mechanical Aspiration** (vacuum) collection is done in mosquito resting places such as the insides of sewer pipes; hollow trees and logs; under the eaves of roofs; the inside walls of sheds, barns and garages; the undersides of bridges; and in and among foliage. Aspiration is the best way to collect mosquitoes that do not respond to traps either due to their species or because they've recently had a blood meal.

**Regional mosquito testing efforts:** Maryland will test for West Nile virus (WNV), malaria, St. Louis encephalitis (SLE) virus, Cache Valley virus, western equine encephalitis (WEE) virus, eastern equine encephalitis (EEE) virus and LaCrosse encephalitis (LAC) virus. The District of Columbia will test for WNV and all other arboviruses that can cause human encephalitis. Virginia will test for WNV, EEE, SLE, LAC and malaria in selected mosquito populations.

## IV. Avian Surveillance

Wild avian morbidity / mortality surveillance appears to be the most sensitive early detection system for West Nile virus because certain species of wild avians are more vulnerable to the effects of West Nile virus than other animal species. Wild birds serve as reservoirs through which WNV is passed to mosquitoes and are part of the virus amplification system that peaks in late summer and early fall. The increased prevalence of dead birds, mainly crows, blue jays, and raptor species has historically indicated the spread of WNV into new areas of the eastern United States.

**Testing dead birds** may provide an efficient means to determine sites for more intensive mosquito surveillance. When enough WNV-confirmed avian deaths are recorded in a locality to ascertain that there is increased WNV activity, deceased bird collection and testing are usually discontinued in that area.

At this time, jurisdictions in Virginia will continue to monitor and test dead birds that meet species and locality requirements. (See [Appendix D](#) for reporting protocol)

Due to a combination of the now endemic nature of WNV in their jurisdictions and updated guidelines for mosquito surveillance and control, Maryland and the District of Columbia will no longer continue to collect or track deceased birds. The public can dispose of these birds without risk of WNV infection, as long as certain precautions are followed. (See [Appendix E](#) for protocol)

**Free-ranging animal seroprevalence studies** provide the opportunity for sampling important host species in which infection is rarely fatal and population replacement rates are high. According to CDC, this type of surveillance has been used effectively in other types of arbovirus (SLE, EEE, and WEE) early detection and monitoring.

Starting in 2003, Maryland and the District of Columbia will initiate a joint research program for serologic sampling of free-ranging and captive wildlife, including wild avian and small mammals, to determine the prevalence of WNV infection in other species in the NCR.

## V. Equine Surveillance

The USDA APHIS reports that more than 14,000 cases of WNV were reported in horses across the US in 2002, up from 470 the previous year. Approximately 30% of horses with WNV-associated illness die or are euthanized. Generally, horses that live through the two to three weeks of WNV infection recover fully with no long-term side effects. Horses are unlikely to develop viremias sufficient to infect feeding mosquitoes, and are therefore unlikely to pose a risk in spreading WNV. However, WNV-confirmed equine cases will most often reflect intense enzootic WNV activity in local mosquitoes, which places humans at increased risk and should therefore be a trigger for increased mosquito control efforts.

Local veterinary practitioners should report any equine with neurologic signs to the nearest animal health laboratory or the state veterinary department for appropriate diagnostic testing.

All NCR jurisdictions currently recommend equine vaccination. Please consult your veterinarian, state animal health agency or local health department website for more information.

## VI. Human Surveillance

Virginia, Maryland, and the District of Columbia will conduct human surveillance in cooperation with key area hospitals and local medical communities. The level of surveillance is aligned with each jurisdiction's declaration of the season when West Nile virus is at its highest level of activity. Enhanced passive monitoring for encephalitic disease will be done during the months that mosquitoes lie dormant, from late fall through early spring. Active surveillance will be performed throughout the rest of the year, when increased viral activity is detected through avian and mosquito surveillance. If no zoonotic surveillance is being conducted, active human surveillance should commence in June.

Using **enhanced passive surveillance**, local laboratory testing centers will be asked to contact their respective state or local health departments with information about patients who test positive for WNV infection. Local health departments will alert hospitals of the importance of reporting suspected arboviral encephalitides and provide physician education on the diagnostic criteria for WNV and the submission of laboratory specimens. Local or state health departments will forward results to the CDC. In compliance with HIPPA regulations, all identifiable patient information is considered confidential.

Using **active surveillance**, local health departments will visit or call hospitals and laboratories on a routine basis to ensure that all human cases of encephalitis are followed appropriately to ensure detection of WNV or other arboviral disease. Some jurisdictions will also track cases of hospitalized aseptic meningitis. Local health departments will contact hospitals' infection control personnel and lab testing centers to retrieve patient information. These cases may include blood or CSF tests to detect the presence of WNV antibodies or virus in the blood or spinal fluid. Local or state health departments will forward results to the CDC. In compliance with HIPPA regulations, all identifiable patient information is considered confidential.

In addition to active and passive surveillance, the Metropolitan Washington Public Health Assessment Center will be collecting regional data on human cases of WNV as reported by the COG jurisdictions in order to provide local health departments with a better understanding of the epidemiology of WNV in the NCR.

CDC guidelines for case definitions of confirmed and probable WNV can be found in [Appendix L](#).

Health care providers can find information, or links to it, on the websites of all COG jurisdictions for the reporting of suspected WNV cases. (See [Appendix F](#).)

Retrospective human data for the NCR and the nation can be found in [Appendix B](#).

## VII. Data Collection and Reporting

In order to provide current and retrospective regional information on the prevalence of West Nile virus and to aid in prevention and control efforts, jurisdictional WNV surveillance data will be shared with regional partners.

### Collection Procedure

The Metropolitan Washington Public Health Assessment Center at the School of Public Health and Health Services at The George Washington University will serve as the regional data collection agency.

Each local public health department, or the state department of health, will submit a weekly electronic report on agreed-upon data to a secure e-mail address at the Assessment Center. The agreed-upon data will include: probable human cases, confirmed human cases, deaths, mosquito pools tested (found positive or negative), and where appropriate, birds tested (found positive or negative) and equines tested.

Each reporting agency will use the format that suits its needs, but the data should include the following elements:

Human cases: age, sex, date of onset, date case confirmed, designation of probable or confirmed, and location by zip code, (if an address is furnished, the Assessment Center will use only a zip code and will not identify the address).

Human deaths: age, sex, date of death and location by zip code.

Mosquito traps or pools: date of test, mosquito genus and species found, positive or negative for WNV, trap type (collection method), collection date, and location by collection site code and zip code.

Birds: date found, date of confirmation, location of bird by zip code, species of bird, and positive or negative for WNV.

Equines: Age, sex, date of onset (if possible), date of death, vaccination status, and location by zip code.

### Analysis and Mapping

The Assessment Center will prepare tables and maps showing the distribution of the data received. These data and maps will be made available on a timely basis to the health officials on a secure web site. Final reports will be prepared at the close of the West Nile season.

### Reporting Procedure

The Assessment Center will post the data and maps on a secure website with password required for access by the health officials. The COG Health Officials Committee will determine what types of data and maps should be available on a public website, with links to the COG website, the Assessment Center website, and the MWPHA website.

Reports or publications that use the data collected by the Assessment Center will obtain express written permission of jurisdictions that submitted the data, will acknowledge the sources of the data and the authors, and will offer authorship to principal scientists

involved in data acquisition, as agreed upon by the health departments that furnish the data to the Assessment Center.

## VIII. Mosquito Control

The most effective mosquito and arbovirus control programs utilize a system of Integrated Pest Management (IPM). IPM utilizes knowledge of the current mosquito problem to consider from among all available control strategies, the best ones to use. IPM targets the control measures based on: surveillance results of enzootic activity and knowledge of indicated vector species; geography; weather patterns; population proximity and density; and other available jurisdictional resources.

Depending on the jurisdiction, IPM activities may include: public and private property breeding site reduction; proper maintenance of “wet” and “dry” stormwater facilities; reducing mosquito larvae through the use of natural predators and larvicides; public education on mosquito avoidance techniques; and using adulticide sprays that target mature mosquitoes.

Non-insecticidal control may be an economical and ecological way to reduce mosquito populations and control the spread of WNV. This can be achieved by removing standing water on private property, removing or reengineering other water pools that serve as mosquito breeding sites and by introducing natural predators of mosquitoes. These techniques, which are least invasive to the human and animal populations in our environment, are emphasized as the primary steps in mosquito control.

### Breeding Site Reduction

The “Asian Tiger” (*Aedes albopictus*) mosquito is an important vector of WNV to the human population. These mosquitoes breed exclusively in water that pools in small, usually artificial or man-made containers. They do not breed in ground pools (puddles and pools that have a soil substrate). These mosquitoes are very likely to breed in containers on private property and it is essential for mosquito control to have public cooperation in the removal of sources of standing water on private property. Because mosquito larvae take more than seven days to develop, standing water pools should be emptied, removed or changed at least once a week. The public should be informed of effective strategies for the identifying and removing of mosquito breeding sites on their property. (See [Appendix A](#))

### Introduction of Natural Predators

Where appropriate, species of fish and amphibians that eat larvae and adult mosquitoes can be introduced into mosquito breeding habitats. In certain man-made or artificial pools of water, including ornamental ponds, stagnant ditches, and some stormwater retention ponds, mosquito fish can be an effective agent of mosquito larval control. Because mosquito fish can also feed on other fish fry and amphibian offspring, they may be less effective against mosquito larvae when sharing larger, natural water pools and may become invasive and competitive to non-targeted fish and amphibian species. Care should be taken to avoid stocking mosquito fish into bodies of water where they may endanger the native ecology (or where runoff may introduce them to new bodies of water. Please refer to the Virginia State Plan (See [Appendix J](#)) for appropriate species and other caveats.

Natural predators of adult mosquitoes such as bats and birds, are not recognized as effective mosquito control agents due to the insignificant proportion of the population they consume. Additionally, local health officials recommend against encouraging bats in close proximity to areas where there is potential for high human contact due to the possibility of rabies in a small percentage of bats.

### **Watershed Control**

Certain pools of water, including some of those found in natural and created wetlands and stormwater runoffs, can be ideal breeding sites for several species of mosquitoes known to carry WNV. Although a growing number of other species are now being discovered with the virus, members of the *Culex* species are the predominant vector for WNV transmission. Many of the *Culex* species utilize aquatic habitats such as intermittently flooded sites and certain shallow areas within permanent freshwater habitats as breeding sites.

Local jurisdictions will treat publicly maintained pools of standing water according to IPM strategies and in accordance with any federal or state wetland regulations. Emphasis will be on maintaining proper upkeep and drainage of stormwater ponds and wetlands, which may be followed by larvicide applications if indicated by surveillance. While the creation of best management practices (BMPs) and wetland development have proven to be very successful ways of reducing flooding and protecting water quality, studies now show that certain BMPs and created wetlands contribute to local mosquito populations. Mosquito control experts will meet with stormwater management officials to determine recommendations for current stormwater maintenance and future BMP design, the results of which will be added to this plan as [Appendix N](#).

### **Larvicide Application**

When larval dip surveillance detects a substantial number of mosquito larvae in a pool of water that cannot be drained or when environmental and cost considerations prevent the elimination of some breeding habitats through habitat modification procedures, larviciding can be a highly effective way to reduce future adult populations of mosquitoes. In general, larval control is the most effective method of controlling certain mosquito species, is applied to a smaller area of the environment than adulticides and has less effect on non-target species than most adulticides.

Larval reduction also serves to diminish the subsequent costs of mosquito control.

Larvicide choice will depend on the species of mosquito, the water source, the growth stage of larvae, and the ecology of the water system. Some larvicides have a greater ecological impact than others and should only be used as a last resort and on habitats such as puddles or other unnatural habitats. The following larvicides are listed in the order of least invasive to the surrounding ecology to more invasive.

The larvicides that control mosquito larvae include:

- a) Bacterial larvicides (Bt or Bs) (more successful in freshwater habitats) that can often be purchased over-the-counter. Of the larvicides, these impact the fewest non-target species.
- b) Biochemical growth regulator larvicides (can be used in salt marshes also)

- c) Water surface tension disrupters (prevents mosquito larvae from breathing / use when larvae have reached pupal stage).
- d) Water surface oils or films (prevents mosquito larvae from breathing / use when larvae have reached pupal stage / limit to artificial containers or puddles).
- e) Chemical larvicide (limit to artificial containers or puddles)

All privately owned or controlled wetlands, ponds, and stormwater ponds should be properly maintained, and if necessary, should utilize larviciding or introduce predators to reduce mosquito populations and arboviral risk. Jurisdictions with ordinances prohibiting the breeding and harboring of disease-causing insects are encouraged to enforce such codes, including any fines or citations, to help reduce arboviral breeding sites.

For jurisdictional procedures on larviciding please refer to local or state plans. ([Appendices H, I, J](#))

### **Adulticide Application**

Adulticides are chemical insecticides that are applied by machine in the form of a fog or fine mist to kill flying mosquitoes. All adulticides have a label designating their use for area control of adult mosquitoes.

Adulticide applications can be used to reduce the population of adult mosquitoes that emerge from a local breeding habitat. Adulticides may be the only way to locally reduce the number of mosquitoes from breeding habitats that are too distant or large to treat with larvicides. Adulticides are usually used to reduce the size of an adult mosquito population in an area. However, if applied repeatedly over a wide area in a well-timed manner (soon after an adult brood emerges), adulticides may be able to reduce future mosquito populations by reducing the number of mosquitoes laying eggs.

To be effective, adulticides must be applied during a period when mosquitoes are actively flying (i.e., when air temperatures are  $>55^{\circ}\text{F}$ ) and may depend on the WNV vector species indicated in a locality. Certain species of mosquitoes (e.g., Asian tiger mosquitoes) do not spend much time in flight and cannot be effectively controlled with area applications of adulticides.

This technique is most useful when larval control is not possible or is impractical. When possible, adulticide use should be a complement to larviciding and habitat modification programs, not an alternative. Adulticide spraying is considered a last resort due to the financial and ecological burden it may present, and the many factors that may reduce its effectiveness.

Although some studies have recently reported that, if applied correctly, adulticide spraying of mosquitoes generally will not harm people or larger animals, insecticide spraying may have a negative health impact on certain vulnerable populations. Insecticide sprays may serve as an asthma trigger for sensitive children and adults and those people living with compromised immune systems. If use of insecticide sprays

becomes necessary, local governments should provide residents with advance notice on location and time of spraying. Improper use of insecticides has the potential to kill non-target insects such as honeybees and small animals (e.g., frogs or fish) in the treated area.

For details on individual jurisdictions' adulticiding techniques and any necessary licensing or certification necessary for applying adulticide please refer to their state plans. ([Appendices H, I, J](#))

## IX. Jurisdictional and Regional Communication

### Communication between jurisdictions and with the CDC

West Nile virus has been an emerging disease in the United States during the last few years. Local surveillance and control protocols have changed as the disease becomes endemic to our region. It is important to share “best practices” as they are developed across the NCR in the oncoming years.

The COG Mosquito-Borne Pathogens Task Force (MBPTF) will meet periodically, on behalf of the NCR Health Officials, to: communicate jurisdictional response; coordinate regional response; coordinate regional community outreach and education; and share “best practices” on WNV and other arboviruses. This group has formed inter-agency and inter-jurisdictional working relationships that will facilitate timely communication throughout the National Capitol Region.

The MBPTF will report monthly during mosquito season to the Health Officials Committee on the status of WNV and the effect and impact of control efforts in the NCR.

WNV encephalitis is on the list of designated nationally notifiable diseases and is being reported to CDC through ArboNet. Some jurisdictions also are obtaining data on WNV aseptic meningitis and WN fever cases. As such, local agencies are following CDC guidelines for communication between physicians, hospitals, laboratory facilities, local and state health departments and the CDC concerning human surveillance. A case definition for WNV infection, agreed to by the Council of State and Territorial Epidemiologists (CSTE) and CDC, can be found in [Appendix L](#).

In order to coordinate and improve regional response, Health Officials and mosquito control authorities will notify their counterparts in the other COG jurisdictions in the following circumstances:

- Any deaths where WNV is indicated as a contributory agent
- Any mosquito or larval control activity planned in a locality near a jurisdictional boundary
- When initial mosquito control efforts are employed each year
- When any aerial sprayings are scheduled
- Any unusually high WN viral activity in a locality;
  - Sharp spikes in WNV-positive mosquito pools
  - Unexpected surge in equine or avian cases
- Any planned WN-related press releases or conferences;
  - Relating to public education and outreach
  - Relating to a national or local incident or story that will create local media attention

An e-mail distribution list of the appropriate authorities from each jurisdiction will be utilized to share this information. In the rare event that WN viral activity results in a local

emergency, Health Officials will notify each other through the COG Regional Incident Communication and Coordination System (RICCS).

### **Community Outreach and Education**

The participating jurisdictions will inform citizens of the risk from arboviruses and advise them of the surveillance, source reduction, and control methods being put into place. To complement the local government's efforts, cooperation and participation in mosquito control activities will be needed from the general population. Citizens will be educated about the vital role they play and will be encouraged to identify and eliminate mosquito breeding sites on their property and to take personal protection measures.

The region's Health Departments will provide information to the public, health care workers, government workers, and tourists in the Washington metropolitan region. Health officials in the region will develop and distribute public service announcements, flyers, posters, and brochures as needed to inform the community about reducing mosquito breeding sites and protecting themselves from mosquitoes. Supplemental information will be posted on jurisdictions' web sites with links to additional resources. (See [Appendix F](#).) Additionally, news briefings, community alerts, press releases, community meetings, and a presence of public health officials at many public events will reinforce the messages concerning West Nile virus.

The Mosquito-Borne Pathogens Task Force will organize public outreach efforts to coordinate with the spring season (when breeding site reduction and larval targeting will be most effective), during the peak of the mosquito season, and when mosquito avoidance techniques are most beneficial.

By reaching out to the NCR residents with appropriate and timely messages for the population being served, the COG Health Officials hope to raise public awareness of West Nile virus, mosquito control practices, personal protection, and ways to reduce the risk of being bitten by mosquitoes.

## Appendix A: Private Property Mosquito Breeding Site Reduction Strategies

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Reducing the mosquito population around your home and property is one of the most effective ways to reduce mosquito bites and can be accomplished by eliminating standing or stagnant water. In this way, you reduce the number of places mosquitoes can lay their eggs and breed. *(Some mosquito species can even breed in water pools as small as the size of a bottle cap.)*

- At least once or twice a week, remove standing water that may accumulate on the property (e.g., in lawn ornaments, flower pots, tarps or plastic covers, outdoor air conditioning units, blocked gutters, etc)
- Destroy or dispose of tin cans, plastic containers, tires, and any other objects that can hold water. Used tires are very significant mosquito breeding sites.
- Empty and refresh pet water dishes, watering troughs, and birdbaths at least once per week if not more often.
- Ensure that garbage cans and receptacles have tight fitting lids.
- Check for clogged rain gutters and clean them out.
- Repair window and door screens. Make sure they are “bug tight.”
- Use landscaping to eliminate standing water that collects on your property
- Remove any standing water under or around structures or on flat roofs. Check around faucets and air conditioner units and repair leaks or puddles that remain for several days.
- Keep swimming pools, hot tubs, and spas treated and circulating. If not in use, cover. Make sure water does not collect on the cover.
- Turn over plastic wading pools and wheelbarrows when not in use.
- Aerate ornamental pools and ponds. (and perhaps stock with mosquito-eating fish)
- Clean vegetation and debris from edges of ponds. Mosquitoes use vegetation to protect and anchor their larvae.
- Irrigate lawns and gardens carefully to prevent standing water.
- Outdoor A/C units often have a pan that collects water inside the unit and ducts that enter the house. This is a common way that mosquitoes enter the home. Keep units dry.
- Store small boats upside down. Cover large boats. Make sure the drain plug is removed so water can drain out of the boat. Make sure water does not collect on the cover.
- Be sure to check for containers or trash in places that may be hard to see, such as under bushes or under your home.
- Drill holes in the bottoms of recycling containers that are kept outdoors.
- Plastic and metal corrugated pipes routinely collect water in their ridges. Consider placing a fine screen over the ends to prohibit mosquito entry or replace with non-corrugated pipes.
- Share this information with a neighbor.

**Appendix B: 1999 – 2002, WNV Human Cases (Nationally and in the NCR)**

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<b>2001 National Capital Region Data</b> (as of March 12, 2003)		
<i>Community</i>	<i>Probable &amp; Confirmed Cases</i>	<i>Deaths</i>
Prince George's County	<b>1</b>	<b>0</b>
<b>Metropolitan Washington Region</b>	<b>1</b>	<b>0</b>

<b>2002 National Capital Region Data</b> (as of March 12, 2003)		
<i>Community</i>	<i>Probable &amp; Confirmed Cases</i>	<i>Deaths</i>
Frederick County	<b>5</b>	<b>0</b>
Prince George's County	<b>7</b>	<b>2</b>
Arlington County	<b>4</b>	<b>0</b>
Loudoun County	<b>2</b>	<b>1</b>
<b>Metropolitan Washington Region</b>	<b>73</b>	<b>7</b>

Maryland (entire state)	<b>36</b>	<b>7</b>
Virginia (entire state)	<b>29</b>	<b>2</b>

Regional data provided by the Metropolitan Washington Public Health Assessment Center  
 Sources: D.C. Department of Health; Maryland Department of Health and Mental Hygiene;  
 Virginia Department of Health.

<b>1999 – 2002 Human Cases of WNV in the United States</b> (as of April 15, 2003)		
<i>Year</i>	<i>Probable &amp; Confirmed Cases</i>	<i>Deaths</i>
1999	<b>62</b>	<b>7</b>
2000	<b>17</b>	<b>2</b>
2001	<b>66</b>	<b>9</b>
2002	<b>4156</b>	<b>284</b>

## Appendix C: Avoidance of Adult Mosquitoes by the Public

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Human illness from West Nile virus is rare, even in areas where the virus has been reported. The chance that any one person is going to become ill from a mosquito bite is low.

You can further reduce your chances of becoming ill by protecting yourself from mosquito bites.

### To avoid mosquito bites:

- Apply insect repellent containing DEET (N,N-diethyl-meta-toluamide) to exposed skin whenever you are outdoors. An effective repellent will contain no more than 50% DEET. DEET in higher concentrations (greater than 50%) does not provide additional protection. For children, use sprays with DEET levels less than 10%. Also, repellents may irritate the eyes and mouth, so avoid applying repellent to the hands of children.

*\*Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's DIRECTIONS FOR USE, as printed on the product.*

For more details on when and how to apply repellent, see recommendations from the CDC at [http://www.cdc.gov/ncidod/dvbid/westnile/qa/insect\\_repellent.htm](http://www.cdc.gov/ncidod/dvbid/westnile/qa/insect_repellent.htm).

- When possible, wear long-sleeves, long pants and socks when outdoors. Since mosquitoes may bite through thin clothing, choose clothing that is light colored and loose fitting or treat clothes with repellents containing DEET or permethrin to give extra protection. Do *not* apply repellents containing permethrin directly to skin. Do *not* spray repellent containing DEET on the skin under your clothing.
- Different kinds of mosquitoes bite at different times of the day or night so try to avoid being out at times and in areas where mosquitoes are biting or take *extra* care to use repellent and protective clothing during these times.
- Repair window and door screens. Make sure they are "bug tight".
- Reduce the number of mosquitoes in your environment. Mosquitoes lay their eggs in standing water. Limit the number of places around your home for mosquitoes to breed by getting rid of items that hold water. Need examples? Learn more on [how to reduce mosquito breeding sites](#) around your home.
- Note: Bats, bug zappers and "ultrasonic" devices are NOT effective in preventing mosquito bites.

**How to use DEET products safely:** Consumers can reduce their own risks when using DEET by reading and following products labels. Statements on all DEET product labels will be revised to include the following directions:

- Read and follow all directions and precautions on this product label.
- Do not apply over cuts, wounds, or irritated skin.
- Do not apply to hands or near eyes and mouth of young children.
- Do not allow young children to apply this product themselves.
- Use just enough repellent to cover exposed skin and/or clothing. Avoid over-application of this product.
- Do not use under clothing.
- After returning indoors, wash treated skin with soap and water.
- Wash treated clothing before wearing it again.
- Use of this product may cause skin reactions in rare cases. The following additional statements will appear on the labels of all aerosol and pump spray formulation labels:
  - Do not spray in enclosed areas.
  - To apply to face, spray on hands first and then rub on face. Do not spray directly onto face.

## Appendix D: Avian Reporting Guidelines

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### WHAT SHOULD I DO IF I FIND A DEAD BIRD?

Dead birds act as a sentinel and dead bird surveillance is one of the components of Integrated Pest Management for West Nile virus. The **District of Columbia** and **Maryland** have determined that West Nile virus is now endemic in their jurisdictions and are no longer studying dead birds. If you find a dead bird in the District or Maryland, please dispose of the bird yourself (See [Appendix E](#) for protocol).

In 2003, **Virginia** will continue to monitor, and in some cases test, dead birds reported to local health departments. Only selected [crows](#), [blue jays](#) and [raptors](#) (i.e. hawks, falcons or owls) will be tested for mosquito-borne viruses, because they are the best early signs of virus activity in an area. However, once a certain number of positive birds are identified in a locality, testing may cease except for special circumstances. In **Virginia**, contact your local health department to determine whether the bird should be submitted for laboratory testing, or visit the [Virginia Department of Health Web site](#) for more information.

- [Alexandria](#): 703-838-4775 (Animal Control)
- [Arlington](#): 703-931-9241 (Animal Welfare League)  
or 703-228-7968 (Health Department)
- [Fairfax](#): 703-246-2300
- [Loudoun](#): 703-777-0234
- [Prince William](#): 703-792-7320 or 7340

## Appendix E: Dead Bird Handling and Disposal

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To properly dispose of a dead bird, please follow this procedure:

- Wear protective gloves or use a plastic bag as a glove
- Place or wrap the dead bird in a plastic bag and tie the bag securely
- Dispose of the bag in an outdoor trash receptacle
- Wash your hands with soap and water

Remember, the West Nile virus is unlikely to be transmitted directly from birds to humans.

For additional information in the **District of Columbia**, please visit the [Department of Health website](#) or call the West Nile Virus Call Center at (202) 535-2323 (M-F 8:15 - 4:45 pm).

For additional information in **Maryland**, please visit the [Maryland Department of Health and Mental Hygiene website](#), or call the Maryland Public Health Hot Topics line at 1-866-866-2769. This telephone line will continue to offer pre-recorded messages regarding West Nile virus 24 hours a day, seven days a week.

For additional information in **Virginia**, please visit the [Virginia Department of Health website](#).

## Appendix F: City, County, and State Contact and Website Information

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### **District of Columbia**

#### **District of Columbia Department of Health**

Animal Disease Prevention Division

51 N Street N.E., Sixth Floor

Washington, D.C. 20002

(202) 535-2323

<http://dchealth.dc.gov/index.asp>

WNV info: [http://dchealth.dc.gov/information/fact\\_sheets/westnilevirus.shtm](http://dchealth.dc.gov/information/fact_sheets/westnilevirus.shtm)

### **Maryland**

#### **Maryland Department of Health and Mental Hygiene**

Epidemiology and Disease Control Program

201 West Preston Street, Third Floor

Baltimore, MD 21201

(410) 767-5649

WNV info: [http://edcp.org/html/west\\_nile.html](http://edcp.org/html/west_nile.html)

Maryland Public Health Hot Topics Line: (866) 866-2769

Maryland Department of Agriculture

Mosquito Control

(410) 841-5870

<http://www.mda.state.md.us/geninfo/genera9.htm>

#### **Frederick County Health Department**

350 Montevue Lane

Frederick, Maryland 21702

(301) 694-1029

<http://www.frederickhealth.org/>

#### **Montgomery County Department of Health and Human Services**

401 Hungerford Drive

Rockville, MD 20850

(240) 777 1245

(240) 777-1755

WNV info: <http://www.montgomerycountymd.gov/mc/services/dep/Mosquito/home.htm#Engine>

#### **Prince George's County Health Department**

Communicable and Vector-borne Disease Control Program

3003 Hospital Drive

Suite 1066

Cheverly, Maryland 20785

(301) 583-3750 Fax:(301) 583-3794

<http://www.goprincegeorgescounty.com/Government/AgencyIndex/Health/index.asp?h=20&s=&n=160>

WNV info:

<http://www.goprincegeorgescounty.com/Government/AgencyIndex/Health/westnile.asp?h=20&s=40&n=0>

## **Virginia**

### **Virginia Department of Health**

Office of Epidemiology  
1500 East Main Street, Room 123  
Richmond, Virginia 23219  
(804) 786-6261  
<http://www.vdh.state.va.us/>

WNV info: <http://www.vdh.state.va.us/epi/wnv.htm>

*To report a dead or sick bird:* Please call your local jurisdiction

### **Alexandria Health Department**

517 North Saint Asaph Street  
Alexandria, VA, 22314  
(703) 838-4400  
<http://ci.alexandria.va.us/city/health/health.html>

WNV info: [http://ci.alexandria.va.us/city/health/westnile\\_virus.html](http://ci.alexandria.va.us/city/health/westnile_virus.html)  
[http://ci.alexandria.va.us/city/health/mosquito\\_control.html](http://ci.alexandria.va.us/city/health/mosquito_control.html)

*To report a dead or sick bird:* (703) 838-4853

*For more WNV info:* (703) 838-4400 ext. 266

### **Arlington County Environmental Health Bureau**

1800 North Edison Street  
Arlington, VA 22207  
(703) 228-4992

WNV info: <http://www.co.arlington.va.us/westnile/>

*Mosquito control info:* (703) 228-7968

*To report a dead or sick bird:* (703) 931-9241

### **Fairfax County Health Department**

10777 Main Street  
Fairfax, VA 22030

WNV info: <http://www.fairfaxcounty.gov/fightthebite>

*To report a dead or sick bird:* (703) 246-2300

### **Loudoun County Health Department**

1 Harrison Street, S.E., 2nd Floor; P.O. Box 7000  
Leesburg, VA 20177  
(703) 777-0234  
<http://www.loudoun.gov/depts/health.htm>

WNV info: <http://www.loudoun.gov/general/wnvirus.htm>

*To report a dead or sick bird:* (703) 777-0234

**Prince William Health District**

9301 Lee Avenue

Manassas, VA 20110

(703) 792-6300

<http://www.pwcgov.org/health/>

*WNV info:* [http://www.pwcgov.org/pworks/env\\_services/mosquito.htm](http://www.pwcgov.org/pworks/env_services/mosquito.htm)

*To report a dead or sick bird:* (703) 792-6310

## Appendix G: COG, MWPHAC, and CDC Contact and Website Information

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### **Metropolitan Washington Council of Governments**

777 N. Capitol Street, N.E.  
Suite 300  
Washington, D.C. 20002-4239  
202-962-3200  
[www.mwcog.org](http://www.mwcog.org)

WNV info: [www.mwcog.org/services/health/westnileinfo/](http://www.mwcog.org/services/health/westnileinfo/)

### **Metropolitan Washington Public Health Assessment Center**

At The George Washington University  
School of Public Health and Health Services  
Ross Hall, Suite 120  
2300 I Street, NW  
Washington, DC 20037  
301-681-5017  
<http://www.gwumc.edu/spphs/mwphac/>

### **Centers for Disease Control and Prevention**

Division of Vector-Borne Infectious Diseases  
P.O. Box 2087  
Fort Collins, Colorado 80522  
[www.cdc.gov](http://www.cdc.gov)  
WNV info: [www.cdc.gov/ncidod/dvbid/westnile/index.htm](http://www.cdc.gov/ncidod/dvbid/westnile/index.htm)  
WNV hotline: (888) 246-2675

### **Other websites:**

EPA / CDC: Joint Statement on Mosquito Control in the United States from the U.S. Environmental Protection Agency (EPA) and the U.S. Centers for Disease Control and Prevention (CDC):  
[www.epa.gov/pesticides/factsheets/mosquitojoint.htm](http://www.epa.gov/pesticides/factsheets/mosquitojoint.htm)

EPA: Larvicides for Mosquito Control:  
[www.epa.gov/pesticides/factsheets/larvicides4mosquitos.htm](http://www.epa.gov/pesticides/factsheets/larvicides4mosquitos.htm)

USGS: National, State, County 2003 WNV maps  
[http://cindi.usgs.gov/hazard/event/west\\_nile/west\\_nile.html](http://cindi.usgs.gov/hazard/event/west_nile/west_nile.html)

**Appendix H: District of Columbia West Nile Virus Plan**

The District of Columbia plan can be found on the Department of Health website at:  
[http://dchealth.dc.gov/information/wnv/pdf/wnv\\_plan2003.shtm](http://dchealth.dc.gov/information/wnv/pdf/wnv_plan2003.shtm)

**Appendix I: Maryland Arbovirus Surveillance and Management Plan**

The Maryland plan has been accepted by state officials.

**Appendix J: Virginia West Nile Virus Surveillance and Response Plan, 2003**

The Virginia plan can be found on the Virginia Department of Health website at:  
<http://www.vdh.state.va.us/epi/wnvsrplan/AvianPlan.asp>

## Appendix K: West Nile Virus FAQ

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### Frequently Asked Questions on West Nile Virus

(from CDC, local, and state websites)

- [Overview](#)
- [Transmission](#)
- [Prevention](#)
- [Standing Water](#)
- [Symptoms](#)
- [Human Specimen Testing](#)

#### OVERVIEW

**Q: What is West Nile virus?**

**A.** West Nile virus is a flavivirus commonly found in Africa, West Asia, and the Middle East. It is closely related to the St. Louis encephalitis virus found in the United States. The virus can infect humans, birds, mosquitoes, horses, and some other mammals. Mosquitoes serve as the primary source of [transmission](#) (vector) of the virus to other animals.

**Q. What is West Nile fever?**

**A.** West Nile fever is a case of mild disease in people, characterized by flu-like [symptoms](#). West Nile fever typically lasts only a few days and does not appear to cause any long-term health effects.

**Q. What is West Nile encephalitis?**

**A.** More severe disease due to a person being infected with this virus can be 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 around the brain and the spinal cord, and meningoencephalitis refers to inflammation of the brain and the membrane surrounding it. Encephalitis occurs in people with compromised immune systems, especially elderly.

**Q. Where did West Nile virus come from?**

**A.** West Nile virus has been commonly found in humans and birds and other vertebrates in Africa, Eastern Europe, West Asia, and the Middle East, but until 1999 had not previously been documented in the Western Hemisphere. It is not known from where the U.S. virus originated, but genetically it is most closely related to strains found in the Middle East.

**Q. How long has West Nile virus been in the U.S.?**

**A.** It is not known how long it has been in the U.S., but CDC scientists believe the virus has probably been in the eastern U.S. since the early summer of 1999, possibly longer.

**Q. Is West Nile virus now established in the Western Hemisphere?**

**A.** The continued expansion of West Nile virus in the United States indicates that it is permanently established in the Western Hemisphere.

**Q. Is the disease seasonal in its occurrence?**

**A.** In the temperate zone of the world (Maryland, Virginia, DC) (i.e., between latitudes 23.5° and 66.5° north and south), West Nile encephalitis cases occur primarily in the late summer or early fall. In the southern climates where temperatures are milder, West Nile virus can be transmitted year round.

## TRANSMISSION

### **Q. How do people get infected with West Nile virus (WNV)?**

- A.** The principle route of human infection with West Nile virus is through the bite of an infected mosquito. Mosquitoes become infected when they feed on infected birds, which may circulate the virus in their blood for a few days. The virus eventually finds its way into the mosquito's salivary glands. During subsequent blood meals, the virus may be injected into humans and animals, where it can multiply and possibly cause illness.

Additional routes of infection have become 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. Additional routes include [transplacental](#) (mother-to-child) WNV transmission, receiving [infected blood](#) products or organs, and accidental infection of [laboratory workers](#).

### **Q. What is the basic transmission cycle of West Nile virus?**

- A.** Mosquitoes become infected when they feed on infected birds, which may circulate the virus in their blood for a few days. Infected mosquitoes can then transmit West Nile virus to humans and other mammals while biting to take blood. During blood feeding, the virus may be injected into the animal or human, where it may multiply, possibly causing illness.

### **Q. If I live in an area where birds or mosquitoes with West Nile virus have been reported and a mosquito bites me, am I likely to get sick?**

- A.** No. Even in areas where the virus is circulating, very few mosquitoes are infected with the virus. Even if the mosquito is infected, less than 1% of people who get bitten and become infected will get severely ill. The chances you will become severely ill from any one mosquito bite are extremely small.

### **Q. Can you get West Nile encephalitis from another person?**

- A.** No. West Nile encephalitis is NOT transmitted from person-to-person. For example, you cannot get West Nile virus from touching or kissing a person who has the disease, or from a health care worker who has treated someone with the disease.

### **Q. Can you get West Nile virus directly from birds?**

- A.** There is no evidence that a person can get the virus from handling live or dead infected birds. However, persons should avoid barehanded contact when handling *any* dead animals and use gloves or double plastic bags to place the carcass in a garbage can.

### **Q. Can you get WNV from eating game birds or animals that have been infected?**

- A.** There is no evidence that WNV virus can be transmitted to humans by consuming infected birds or animals. In keeping with overall public health practice, and due to the risk of known food-borne pathogens, people should always follow procedures for fully cooking meat from either birds or mammals.

### **Q. How does West Nile virus actually cause severe illness and death in humans?**

- A.** Following transmission by an infected mosquito, West Nile virus multiplies in the person's blood system and crosses the blood-brain barrier to reach the brain. The virus interferes with normal central nervous system functioning and causes inflammation of brain tissue.

**Q. How long does the West Nile virus remain in a person's body after they are infected?**

**A.** There is no scientific evidence indicating that people can be chronically infected with West Nile virus. What remains in a person's body for long periods of time are antibodies and "memory" white blood cells (T-lymphocytes) that the body produces to the virus. These antibodies and T-lymphocytes last for years, and may last for the rest of a person's life. Antibodies are what many diagnostic tests look for when clinical laboratories testing is performed. Both antibodies and "memory" T-lymphocytes provide future protection from the virus.

**Q. If a person contracts West Nile virus, does that person develop a natural immunity to future infection by the virus?**

**A.** It is assumed that immunity will be lifelong; however, it may wane in later years.

Pregnant Women

**Q. Is a woman's pregnancy at risk if she gets infected with West Nile virus?**

**A.** There is one documented case of transplacental (mother-to-child) transmission of WNV in humans. Although the newborn in this case was infected with WNV at birth and had severe medical problems, it is unknown whether the WNV infection itself caused these problems or whether they were coincidental. More research will be needed to improve our understanding of the relationship - if any - between WNV infection and adverse birth outcomes.

Nevertheless, pregnant women should take precautions to reduce their risk for WNV and other arboviral infections by avoiding mosquitoes and using protective clothing and repellents containing DEET (See [Appendix C](#)). When WNV transmission is occurring in an area, pregnant women that become ill should see their health care provider. Those whose illness is consistent with acute WNV infection (see [Symptoms](#)) should undergo appropriate diagnostic testing.

Blood / Organ Recipients

**Q. Is West Nile virus (WNV) transmitted by blood transfusion or organ donation?**

**A.** A recent investigation has identified transplanted organs as the source of WNV infection in four recipients of organs from a single donor. How the organ donor became infected is unknown. The organ donor might have become infected from a mosquito bite or possibly acquired the infection through transfusion. An investigation of the numerous transfusions received by the organ donor is ongoing. Since the report of these cases, CDC has been informed of other patients who developed WNV infection within several weeks of receiving blood products or organs. Investigations are ongoing to determine whether WNV was transmitted by transfusion or transplantation in any of these cases.

**Q. Should people avoid donating blood or getting blood transfusions or organ transplants?**

**A.** Blood is lifesaving and is currently in short supply. Donating blood is safe, and we encourage donating blood now and in the future. Approximately 4.5 million persons receive blood or blood products annually. Although persons needing blood transfusions or organ transplants should be aware of the risk for WNV infection, the benefits of receiving needed transfusions or transplants outweigh the potential risk for WNV infection.

**Q. If a person has had West Nile virus, can they still donate blood?**

**A.** With West Nile virus infection, the viremia usually is transient, and people clear the virus very quickly. Blood centers will take precautions (see preceding question and answer) to be sure that donors who have been diagnosed with West Nile virus have fully recovered before donating.

### Laboratory Workers

**Q. Are laboratory workers in contact with WNV-positive specimens at risk for WNV infection?**

**A.** Yes, approximately 20 laboratory-acquired WNV infections have been reported in the medical literature over many decades. In the two most recently reported cases, WNV infection of two microbiologists working with WNV-positive samples resulted from percutaneous inoculation (pierced through the skin). Both persons had mild, self-limited illnesses.

As more laboratories have recently become involved in WNV diagnostic and reference activities, the risk for laboratory acquired WNV infections has probably increased. Laboratory workers handling materials that are potentially infected with WNV should use every precaution to minimize their risk for exposure.

### **PREVENTION**

**Q. What can I do to reduce my risk of becoming infected with West Nile virus?**

**A.**

- Avoid outdoor activities at places and times when mosquitoes are biting.
- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Spray clothing with repellents containing permethrin or DEET (mosquitoes can bite through thin clothing)
- Apply insect repellent sparingly to exposed skin. An effective repellent will contain up to 50% DEET. DEET in higher concentrations (greater than 50%) does not provide additional protection. For children, use sprays with DEET levels less than 10%. Also, repellents may irritate the eyes and mouth, so avoid applying repellent to the hands of children.
  - \* *Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's DIRECTIONS FOR USE, as printed on the product.*  
*(for more information on DEET, see [How to use DEET products safely:](#))*
- Install or repair window and door screens so that mosquitoes cannot get indoors.

*For a full list of protective actions, see [Appendix C](#).*

**Q. Is there a human vaccine against West Nile encephalitis?**

**A.** No, but several companies are working towards developing a vaccine.

### **STANDING WATER**

**Q. How can I control mosquito populations around my home?**

- A.** Help reduce the number of mosquitoes in areas outdoors where you work or play, by draining sources of standing water. In this way, you reduce the number of places mosquitoes can lay their eggs and breed.
- At least once or twice a week, empty water from flower pots, pet food and water dishes, birdbaths, swimming pool covers, buckets, barrels, and cans.
  - Check for clogged rain gutters and clean them out.
  - Remove discarded tires and other items that could collect water.
  - Be sure to check for containers or trash in places that may be hard to see, such as under bushes or under your home.
  - Outdoor A/C units often have a pan that collects water inside the unit and ducts that enter the house. This is a common way that mosquitoes enter the home. Keep units dry.

*For a full list of mosquito breeding-site reduction tactics, see [Appendix A](#).*

## SYMPTOMS

**Q. What are the symptoms of West Nile virus infection?**

- A.** Most people who are infected with the West Nile virus will not have any type of illness. It is estimated that 20% of the people who become infected will develop West Nile fever: mild symptoms, including fever, headache, and body aches, occasionally with a skin rash on the trunk of the body and swollen lymph glands.

The symptoms of severe infection (West Nile encephalitis or meningitis) include headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis. It is estimated that 1 in 150 persons infected with the West Nile virus will develop a more severe form of disease.

**Q. What is the incubation period in humans (i.e., time from infection to onset of disease symptoms) for West Nile encephalitis?**

- A.** Usually 3 to 14 days.

**Q. How long do symptoms last?**

- A.** Symptoms of mild disease will generally last a few days. Symptoms of severe disease may last several weeks, although neurological effects may be permanent.

## HUMAN SPECIMEN TESTING

**Q. Should I (or someone in my family) be tested for West Nile virus if bitten by a mosquito?**

- A.** No. Testing for West Nile virus is a complex process. It takes a long time to get test results and only a very small percentage of the mosquitoes that might bite you are infected. While test results are important to scientists and medical doctors studying the disease, they would not be very useful to you as an individual. There has not been a particular cure for West Nile virus--so a sick person is not better off having been tested for WNV infection. If you become seriously ill, you should see your doctor, no matter what the cause or name of the illness.

**Q. I think I have symptoms of WNV. What should I do?**

- A.** Contact your health care provider if you have concerns about your health. If you or your family members develop symptoms such as high fever, confusion, muscle weakness, and severe headaches, you should see your doctor immediately.

**Q. Who is at risk for getting West Nile encephalitis?**

- A.** All residents of areas where virus activity has been identified are at risk of getting West Nile encephalitis; persons over 50 years of age have the highest risk of severe disease. It is unknown if immunocompromised persons are at increased risk for WNV disease.

**Q. How do health care providers test for WNV?**

- A.** Your physician will first take a medical history to assess your risk for West Nile virus. If you are determined to be at high risk and have symptoms of West Nile encephalitis, your provider will draw a blood sample and send it to a commercial or public health laboratory for confirmation.

**Q. How is WN encephalitis treated?**

- A.** There is no specific treatment for West Nile virus infection. In more severe cases, intensive supportive therapy is indicated, often involving hospitalization, intravenous fluids, airway management, respiratory support (ventilator), prevention of secondary infections (pneumonia, urinary tract, etc.), and good nursing care.

## Appendix L: CSTE and CDC-Recommended Surveillance Case Definitions for West Nile-Related Illnesses

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### CSTE / CDC Surveillance Case Definition for Arboviral Encephalitis or Meningitis, 2001

#### Clinical description

Arboviral infections may be asymptomatic or may result in illnesses of variable severity sometimes associated with central nervous system (CNS) involvement. When the CNS is affected, clinical syndromes ranging from febrile headache to aseptic meningitis to encephalitis may occur, and these are usually indistinguishable from similar syndromes caused by other viruses. Arboviral meningitis is characterized by fever, headache, stiff neck, and pleocytosis. Arboviral encephalitis is characterized by fever, headache, and altered mental status ranging from confusion to coma with or without additional signs of brain dysfunction (e.g., paresis or paralysis, cranial nerve palsies, sensory deficits, abnormal reflexes, generalized convulsions, and abnormal movements).

#### Laboratory criteria for diagnosis

- Fourfold or greater change in virus-specific serum antibody titer, or
- Isolation of virus from or demonstration of specific viral antigen or genomic sequences in tissue, blood, cerebrospinal fluid (CSF), or other body fluid, or
- Virus-specific immunoglobulin M (IgM) antibodies demonstrated in CSF by antibody-capture enzyme immunoassay (EIA), or
- Virus-specific IgM antibodies demonstrated in serum by antibody-capture EIA and confirmed by demonstration of virus-specific serum immunoglobulin G (IgG) antibodies in the same or a later specimen by another serologic assay (e.g., neutralization or hemagglutination inhibition).

#### Case classification

*Probable:* an encephalitis or meningitis case occurring during a period when arboviral transmission is likely, and with the following supportive serology: 1) a single or stable (less than or equal to twofold change) but elevated titer of virus-specific serum antibodies; or 2) serum IgM antibodies detected by antibody-capture EIA but with no available results of a confirmatory test for virus-specific serum IgG antibodies in the same or a later specimen.

*Confirmed:* an encephalitis or meningitis case that is laboratory confirmed

#### Comment

Because closely related arboviruses exhibit serologic cross-reactivity, positive results of serologic tests using antigens from a single arbovirus can be misleading. In some circumstances (e.g., in areas where two or more closely related arboviruses occur, or in imported arboviral disease cases), it may be epidemiologically important to attempt to pinpoint the infecting virus by conducting cross-neutralization tests using an appropriate battery of closely related viruses. This is essential, for example, in determining that antibodies detected against St. Louis encephalitis virus are not the result of an infection with West Nile (or dengue) virus, or vice versa, in areas where both of these viruses occur.

The seasonality of arboviral transmission is variable and depends on the geographic location of exposure, the specific cycles of viral transmission, and local climatic conditions. Reporting

should be etiology-specific (see below; the six encephalitides/meningitides printed in bold are nationally reportable to CDC):

**St. Louis encephalitis/meningitis**

**West Nile encephalitis/meningitis**

**Powassan encephalitis/meningitis**

**Eastern equine encephalitis/meningitis**

**Western equine encephalitis/meningitis**

**California serogroup viral encephalitis/meningitis** (includes infections with the following viruses: La Crosse, Jamestown Canyon, snowshoe hare, trivittatus, Keystone, and California encephalitis viruses)

Other viral CNS infections transmitted by mosquitos, ticks, or midges (e.g., Venezuelan equine encephalitis/meningitis and Cache Valley encephalitis/meningitis)

## CDC-Recommended Surveillance Case Definition for West Nile Fever

### What is a CDC-Recommended Case Definition?

CDC-recommended surveillance case definitions are prepared for use by U.S. States and Territories interested in conducting public health surveillance for diseases or conditions that have not been designated nationally notifiable and have not been officially approved and sanctioned by the Council of State and Territorial Epidemiologists (CSTE). A CDC-recommended case definition may not be approved by CSTE in the future, unless CSTE and the CDC program with responsibility for prevention and control of the selected disease or condition both wish to seek broader and more formalized approval from both organizations.

### CASE DEFINITION

#### Case Description

A non-specific, self-limited, febrile illness caused by infection with West Nile virus, a mosquito-borne flavivirus. Clinical disease generally occurs 2-6 days (range, 2-15 days) following the bite of an infected mosquito. Typical cases are characterized by the acute onset of fever, headache, arthralgias, myalgias, and fatigue. Maculopapular rash and lymphadenopathy generally are observed in less than 20% of cases. Illness typically lasts 2-7 days.

#### Case Classification

A clinically compatible illness, *plus*:

#### **Confirmed:**

- 1) Fourfold or greater change in West Nile virus-specific serum antibody titer;
- 2) Isolation of West Nile virus from or demonstration of specific West Nile viral antigen or genomic sequences in tissue, blood, CSF, or other bodily fluid; or
- 3) West Nile virus-specific IgM antibodies demonstrated in serum by antibody-capture enzyme immunoassay and confirmed by demonstration of West Nile virus-specific serum neutralizing antibodies in the same or a later specimen.

#### **Probable:**

- 1) West Nile virus-specific serum IgM antibodies detected by antibody-capture enzyme immunoassay but with no available results of a confirmatory test for West Nile virus-specific serum neutralizing antibodies in the same or a later specimen.

*(Note: Some West Nile fever cases progress to West Nile meningitis or encephalitis. Cases meeting the more restrictive case definition of West Nile encephalitis/meningitis should be reported as such and only once, using event code 10056 for “West Nile Encephalitis or Meningitis”.)*

## **Comment**

The seasonality of arboviral transmission is variable and depends on the geographic location of exposure, the specific cycles of viral transmission, and local climatic conditions. Because closely related arboviruses exhibit serologic cross-reactivity, positive results of serologic tests using antigens from a single arbovirus can be misleading. In some circumstances (e.g., in areas where two or more closely related arboviruses occur, or in imported arboviral disease cases), it may be epidemiologically important to attempt to identify the infecting virus by conducting cross-neutralization tests using an appropriate battery of closely related viruses. This is essential, for example, in determining that antibodies detected against West Nile virus are not the result of an infection with St. Louis encephalitis or dengue virus, or vice versa. Because dengue fever and West Nile fever can be clinically indistinguishable, the importance of a recent travel history and appropriate serologic testing cannot be overemphasized. In some persons, West Nile virus-specific serum IgM antibody can wane slowly and be detectable for more than one year following infection. Therefore, in areas where West Nile virus has circulated in the recent past, the co-existence of West Nile virus-specific IgM antibody and illness in a given case may be coincidental and unrelated. In those areas, the testing of serially collected serum specimens assumes added importance.

**Date case definition was developed:** October 2002

**Event Code:** 10049

**Source of the case definition:** National Center for Infectious Diseases, Division of Vector-Borne Infectious Diseases, Arbovirus Diseases Branch.

## Appendix M: Glossary of WNV and Other Arboviral Terms

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<b>Arbovirus:</b>	From <u>arthropod borne virus</u> . Any of various RNA viruses transmitted by arthropods (which includes insects, arachnids, crustaceans).
<b>Bt:</b>	<i>Bacillus thuringiensis israelensis</i> is a bacterial larvicide sold under a variety of trade names such as Mosquito Dunks®, VectoBac™, Aquabac™, and Bti Briquets™. Quite effective against most mosquito genera, but slightly less effective on members of <i>Culex</i> genus. Mosquito larvae ingest the bacteria, which causes their gut wall to disintegrate. It is essentially non-toxic to all other organisms except for a few closely related types of flies.
<b>Bs:</b>	<i>Bacillus sphaericus</i> is a bacterial larvicide, similar to Bt, sold under the trade name VectoLex™. Highly effective against <i>Culex</i> genus, but less affective against Asian Tiger and other <i>Aedes</i> mosquitoes.
<b>BMPs:</b>	A storm water best management practice (BMP) is a technique, measure or structural control that is used for a given set of conditions to manage the quantity and improve the quality of storm water runoff in the most cost-effective manner. BMPs are often implemented to address three main factors: flow control, pollutant removal and pollutant source reductions. (Source: <b>Preliminary Data Summary of Urban Storm Water Best Management Practices, USEPA, 1999</b> )
<b>CDC:</b>	The Centers for Disease Control and Prevention is a federal agency of the Department of Health and Human Services.
<b>COG:</b>	Metropolitan Washington Council of Governments is an independent, nonprofit association composed of 18 local governments surrounding our nation's capital.
<b>CSF:</b>	Cerebrospinal fluid.
<b>Dry Ponds:</b>	Stormwater ponds that are designed to hold water for brief periods of time.
<b>HIPPA:</b>	Health Insurance Privacy and Portability Act.
<b>IPM:</b>	Integrated Pest Management.
<b>Encephalitis:</b>	An inflammation of the brain which can be caused by viruses and bacteria, including viruses transmitted by mosquitoes.
<b>Endemic:</b>	Belonging or native to a particular people or country and thus continuously present at the expected frequency of occurrence.
<b>Larva:</b>	The immature stages between the egg and the pupa, of an insect with complete metamorphosis.
<b>Meningitis:</b>	An infection of the tissues (meninges) and sometimes the fluid (cerebrospinal fluid) that surrounds the brain and spinal cord. When brain tissue swells, less blood and oxygen reach brain cells, producing symptoms such as fever, severe headache, and stiff neck.
<b>Mosquito pools:</b>	Adult female mosquitoes batched by species, collection site and collection date. Not a reference to larvae from a body of water.
<b>NCR:</b>	National Capitol Region. Defined as the District of Columbia; Montgomery and Prince George's County in Maryland; Arlington, Fairfax, Loudoun, and Prince William Counties in Virginia; and all cities existing within the geographic area designated by the outer boundaries of these combined counties. For the purpose of this plan, the term <i>region</i> is expanded to include Frederick County Maryland and thus includes all COG member jurisdictions.
<b>Pools of standing water:</b>	Any standing water, including, but not limited to: a few teaspoons of standing water on a tarp or garbage can, a flooded ditch, a shallow pond. References to this target water that has been standing for more than seven days and may often include wading or children's pools. Swimming pools that use their pumps and filters regularly are NOT considered standing water.
<b>Wet Ponds:</b>	Stormwater ponds that are designed to contain water at all times.

## **Appendix N: Mosquito Control Recommendations for BMP Design and Maintenance**

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The Mosquito-Borne Pathogens Task Force has endorsed the text of the Virginia Stormwater Management Program, Technical Bulletin #8, “Vector Control, Mosquitoes and Stormwater Management” written by the Virginia Department of Conservation and Recreation and the Virginia Department of Health, as general recommendations on controlling West Nile virus in new and existing stormwater ponds.

This can be found at: <http://www.dcr.state.va.us/sw/docs/tecbltn8.pdf>

Continued maintenance of stormwater management facilities cannot be over-emphasized, although this presents public and private owners with additional associated costs. Plans for new stormwater ponds should address any maintenance costs, including those related to preventing vector breeding grounds for human diseases.

Future issues to explore include: periodic inspections, frequency of maintenance services, encouraging BMP owners to secure service contracts to perform regular maintenance, considering the use of third party inspectors where appropriate to ensure timely inspection, jurisdictional development of database(s) for tracking the maintenance of stormwater management facilities to enable a more efficient rescheduling of inspection, and equipping regulatory agencies with tools, such as covenants, that will ensure maintenance responsibility is transferred when properties containing stormwater management facilities are sold.