Westchester County Department of Health
Operation Mosquito S.T.I.N.G.*
***Stop the Insects' Next Generation**

Comprehensive Mosquito-borne Disease Surveillance and Control Plan

March 8, 2004

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Executive Summary

Since the appearance of West Nile Virus in our region in late 1999, Westchester County Department of Health has been engaged in preparation for the possible recurrence of West Nile virus (WNV) or other mosquito-borne diseases such as malaria, eastern equine encephalitis, or St. Louis encephalitis. Since autumn of 1999, the Westchester County Department of Health (WCDOH) has been engaged in an intensive planning effort to prepare not only for the possible re-emergence of the West Nile virus, but for a long-term comprehensive approach to preventing arthropod-borne diseases. In addition to the WCDOH's focus on protecting public health in Westchester, we have worked closely with the New York State Department of Health (NYSDOH), the New York City Health Department, the U.S. Centers for Disease Control and Prevention (CDC), and other State and Federal partners to prepare for a regional response to arthropod-borne disease outbreaks.

Key to all of these planning efforts is an emphasis on prevention. Through the initiation of the Operation Mosquito S.T.I.N.G. (Stop The Insects' Next Generation), the WCDOH has and will continue to devote considerable resources to a countywide effort to control mosquito breeding while enhancing existing disease surveillance, and public and medical provider education activities. A major goal of this program is to detect the presence of mosquito-borne infectious agent(s) in the environment, and implement appropriate measures to reduce or prevent the risk of illness in humans.

Although mosquitoes are most active in Westchester County from April through October, a strong mosquito-borne disease surveillance and control program is a year-round activity. The program will rely on the following:

- Existing staff for surveillance, research, evaluation, and administration;
- A seasonal workforce for vector surveillance and control activities;
- Capability for larviciding and, if necessary, spraying pesticides to reduce the adult mosquito population; and
- Communication and coordination with other County, State, and Federal agencies, along with community and professional organizations.

The plan includes the following components:

Mosquito Control

Elimination of mosquito-breeding sites: Beginning early in the spring, WCDOH will work to control mosquitoes through an intensive effort to evaluate areas of standing water and to eliminate mosquito-breeding sites. Working in collaboration with other county, municipal, and voluntary agencies, WCDOH will work to eliminate standing water in empty lots, tire piles and other vessels. These source reduction efforts will need to be sustained throughout the mosquito season, requiring an ongoing vigilance on the part of WCDOH and its partners.

Larviciding: Source reduction efforts will be augmented with application of larvicide in potential breeding grounds where water cannot be eliminated. An underlying principle will be to apply the least toxic, most effective biological or biochemical agents to prevent mosquito larvae from developing into adult vectors of disease. The WCDOH will conduct these activities in compliance with Federal and State guidelines.

Adulticiding: If necessary, application of pesticides to reduce the adult mosquito population may be undertaken if arbovirus activity is detected at a level where human health is threatened. The WCDOH will conduct these activities in compliance with Federal and State guidelines, and will utilize information from the Generic Environmental Impact Statement for this *Comprehensive Plan*, which was prepared under SEQRA. In the event that spraying of pesticides becomes necessary, the WCDOH will work with the NYSDOH to monitor for any potential health effects of pesticide exposure.

Surveillance

Arthropod Vector Surveillance: A system for monitoring mosquitoes will include collecting mosquito larvae and trapping adult mosquitoes throughout the County to track for presence of arthropod-borne disease as well as mosquito density.

Vertebrate Host Surveillance: WCDOH efforts will focus on dead bird surveillance. In addition, surveillance among horses and domestic animals will be conducted by New York State Health Department and the NY State Department of Agriculture & Markets. These data will assist WCDOH in monitoring illness and infection related to arboviruses. These vertebrate hosts serve as an "early warning system" or indicator of the presence of arbovirus in the County and permit appropriate interventions to prevent or reduce the risk of disease transmission to humans.

Human Surveillance: a system of detecting mosquito-borne diseases among humans will include active monitoring for suspected cases of mosquito-borne disease in hospitals. In the long-term, the program will complement physician reporting by establishing sentinel syndromic surveillance

as an early warning signal, and will monitor for infectious disease symptoms that could indicate new or imported infections such as WNV and other arthropod-borne diseases.

Provider Education

Health providers are critical to detecting and preventing arthropod-borne diseases. As has been done since 1999, the WCDOH will continue to enhance education of medical and veterinary professionals regarding diseases transmitted by mosquitoes, especially West Nile virus. These efforts will also promote ongoing cooperation of health care professionals in the surveillance of mosquito-borne and other communicable diseases.

Public Education and Outreach

The WCDOH will continue its multifaceted public education campaign initiated in 1999 regarding the critical role the public can play in eliminating potential mosquito breeding sites. The WCDOH will also continue to enhance the public's knowledge of risk factors for vector-borne diseases and ways to avoid exposure. In the event of a public health threat, the WCDOH will provide accurate and timely information about mosquito control activities.

Research and Evaluation

In collaboration with NYSDOH, CDC, and other regional health departments, research will continue to better understand the transmission and pathogenicity of West Nile virus and other arthropod-borne diseases in urban and suburban settings. Furthermore, WCDOH will conduct an ongoing assessment of the efficacy of disease control measures and strategies for vector control.

INTRODUCTION

In late August 1999, the New York City Department of Health detected an unusual cluster of encephalitis in northern Queens, New York City. Additional cases were detected in Westchester & Nassau Counties. In collaboration with the CDC and the NYSDOH, an extensive epidemiological investigation identified the cause as West Nile virus, which had never before been recognized in the Western Hemisphere.

Through enhanced surveillance efforts in 1999, 46 cases of West Nile encephalitis were confirmed in New York City, with four fatalities; 6 cases occurred in Nassau County; and an additional 9 cases, including one death, occurred in Westchester County. In 2000, despite intensified surveillance, education, and control activities early in the year, 14 cases of WNV were confirmed in humans in the New York metropolitan area. At a cost of over $1.9 million in 1999, $2.3 million in 2000, and an estimated $2.2 million in 2001, the County's rapid response in implementing mosquito control measures and a public health education campaign helped limit the impact of this outbreak. The overall number of cases and the case-fatality rate were relatively low in comparison to similar outbreaks worldwide. This is largely due to the rapid response of the public health system, which worked together at the local, state, and federal level to allocate the resources necessary to address the crisis. In 2001, no local cases of West Nile Virus were identified in humans. In 2002, there were two human cases. In 2003, four human cases were identified.

Although the WCDOH's emergency response has been effective, the unprecedented outbreak highlighted ways for the County to strengthen the infrastructure for mosquito-borne as well as emerging disease surveillance. The WCDOH's decision to initiate a comprehensive mosquito-borne disease surveillance and control program is underscored by two significant factors:

- The widespread presence of West Nile infected birds and mosquitoes beginning in 1999, its geographical spread to most of the U.S. eastern seaboard by 2001 indicates that WNV has established a presence in the region for the foreseeable future and will represent an ongoing public health threat.

- West Nile virus is not the only mosquito-borne disease or new infectious disease threat that may face the County. The West Nile outbreak highlighted our potential vulnerability to imported disease threats as well as the ongoing need to maintain a strong public health infrastructure that can quickly identify new infectious diseases in Westchester County.

This document details the County's plan to detect and implement appropriate prevention measures for mosquito-borne diseases in order to prevent or reduce the risk of illness in WC residents and to permit control efforts to be targeted, effective, and limited in scope. The WCDOH has actively participated in NYSDOH-sponsored workgroups formed to develop a Statewide West Nile virus Response Plan. These workgroups, which included other local health departments, the NYC Health Department, State agencies, and environmental organizations, helped advise the County plan. Additionally, the WCDOH has worked closely with the CDC, and Westchester County agencies including the County Executive's Office; the Office for

Disaster and Emergency Services; and the Departments of Public Works; Transportation; Environmental Facilities; Parks and Recreation; and Community College, to develop a plan that meets the specific needs of Westchester County. The County Board of Health has undertaken an extensive review of the proposed long-term mosquito surveillance and control plan under SEQRA. The information obtained during this examination has been taken into consideration in finalizing the Comprehensive Plan and will continue to guide future decisions regarding mosquito control measures.

MOSQUITO CONTROL

Objective

To control the mosquito population and to protect the public from illness due to mosquito-borne infections.

Background

There are numerous options for mosquito control activities, including: (1) source reduction; (2) biological control; and (3) chemical control (including larvicide and adulticide). Educating the public on the importance of reducing areas of standing water is critical to all of the County's control activities. The WCDOH will invest considerable resources into larviciding catch basins (street-side curb storm drains) and other known breeding habitats to arrest the development of larvae into adult mosquitoes. Larvicides being considered for use include products containing methoprene (e.g., Altosid); *Bacillus thuringiensis var. israelensis* (e.g., Vectobac); and *Bacillus sphaericus* (e.g., Vectolex). These larvicides are considered to have minimal adverse impact on the environment. In the event of a significant public health threat, the WCDOH will also carry out strategic applications of adulticides. The WCDOH will assess and monitor control activities for any potential environmental and health effects.

Activities

- The WCDOH has and will continue to work with the CDC and NYSDOH to identify areas conducive for overwintering mosquitoes, monitor for the presence of mosquitoes at these sites, and test for arbovirus.

- In years when the WCDOH is on alert for the spread or recurrence of a mosquito-borne disease, the application of larvicide will be extensive and aggressive. The WCDOH will apply larvicide in targeted areas throughout the County if indicated and particularly in areas with previous evidence of viral activity and identified as breeding sites for likely mosquito vectors of disease based on surveillance information from 2000, thru 2003.

- Larvicide will also be applied as needed at wastewater treatment plants, certain parks, and sewers if appropriate. The application of larvicide may also be expanded based upon larval surveillance information gathered on the geographic distribution of the number and type of mosquitoes. Larvicide will be applied aggressively during spring/summer, and will continue to be applied throughout the mosquito season, especially after heavy rains, as appropriate and as indicated through surveillance data.

- The WCDOH will work with County municipalities, the Department of Public Works, and the Department of Environmental Facilities to prioritize and enhance the enforcement of lot cleaning and to ensure an aggressive tire disposal program. Poorly maintained vacant lots are particularly conducive to mosquito breeding, and those in high-risk areas

for viral reemergence will be targeted.

Outbreak Plan of Action

Surveillance, breeding ground reduction efforts, a public education and community outreach campaign, and the application of larvicide to reduce the number of mosquitoes are core elements of WCDOH's plan to address arboviruses. Despite these preventive efforts, in the event of a public health threat, the following protocol has been developed:

· Reducing the adult population (adulticiding) with EPA approved pesticides will be done when necessary to prevent or address the potential for illness in the human population. The decision to spray, either on the ground or by air, will be based on surveillance information and the documentation of arbovirus activity. Spraying will be concentrated in areas most at risk for disease occurrence.

· Adulticiding, if necessary, will be conducted by experienced and licensed contractors who are required to follow EPA and NYS DEC requirements.

  - Ground applications will be used along authorized spray routes
  - Aerial applications will be used in County authorized spray zones

· The County will select from among the least toxic pesticides registered for mosquito control use by the EPA and NYS DEC. In 1999 and 2000, a synthetic pyrethroid, sumithrin, was used to combat West Nile virus. The County will continually review all of the available information on the public health impacts of pesticides. Any pesticide selected for use will be applied in compliance with County, State, and Federal laws and regulations.

· The public will receive advance notification of spray schedules. (See Public Information and Outreach.)

Monitoring the potential effects of pesticides

· The County has prepared a GEIS for this Comprehensive Plan. The study addressed the potential impact of pesticide applications on human health, water quality, and natural resources.

· The WCDOH will distribute information on the potential side effects of pesticides to health care providers countywide, and will request reporting of possible pesticide-related illnesses to the State Department of Health's Pesticide Poisoning Registry.

· The WCDOH will examine all possible sources of information (e.g., emergency room visits) that may be useful for monitoring pesticide-related illnesses. The County would maintain a 24-hour telephone system to provide up-to-date information about mosquito control activities and a means for reporting adverse human health impacts from

spraying, and would allow for the County to monitor potential human health effects from the application of adulticides under the Comprehensive Plan. The County would examine other possible sources of information that may be useful for monitoring pesticide-related illnesses.

Emergency Response Plan

Every precaution will be taken to ensure the proper, safe, and secure storage and handling of pesticides. However, in the unlikely event of major accidental emissions or spills of pesticides:

- The County will immediately notify the New York State Department of Environmental Conservation, as well as municipal officials and local police of directly affected communities. Downstream communities will be notified if any beaches or water supplies are involved. Water suppliers and the New York City Department of Environmental Protection will also be notified as appropriate.

- Public notification will be made through the media, the County website, and the County information line.

- Specific cleanup procedures will be conducted in consultation with the New York State Department of Environmental Conservation. Procedures for containment, cleanup and disposal will take into account the type of pesticide involved.

- The WCDOH emergency response team will be mobilized to conduct monitoring of the situation.

VECTOR SURVEILLANCE

Objective

To monitor the dynamics and density of the mosquito population and determine the presence of viruses as early as possible, to permit appropriate interventions for preventing or reducing the risk of human disease.

Background

The risk of mosquito-borne disease depends on both the total number of mosquitoes capable of transmitting a virus and the percentage of arbovirus-infected mosquitoes. Collecting this information for larval and adult mosquitoes is important for appropriate control activities. Larval surveillance can provide information on expected adult mosquito density and areas where efforts to eliminate mosquitoes at their source should be targeted. Adult mosquito surveillance and viral testing provide early predictive information about the potential for a disease outbreak.

This cumulative knowledge from vector surveillance would be used to further refine the other components of the Comprehensive Plan. For example, multi-year data of larva breeding sites and adult mosquito traps, would be used to determine the suitable time for the application of larviciding in catch basins, which may result in less overall larvicide used in a season. Use of geographical information systems (GIS) to track such data will be investigated as appropriate.

Activities

- The WCDOH is working with other County agencies and municipalities to collect, map, and update information on potential mosquito habitats.

- The WCDOH will prioritize areas to be inspected and subjected to regular larval testing to determine the presence of mosquito larvae. In response to nuisance complaints, the WCDOH will conduct larval surveillance where indicated.

- Larval habitat information will be collected and updated throughout the season.

- From May through October, the WCDOH will trap adult mosquitoes at sites throughout the County. The number of sites, the frequency of trap placement, and number of traps per site will vary depending on where the virus is most likely to be present.

- Based on current technology, mosquitoes will be collected using at least two different types of traps - CDC light traps (outfitted with a light and dry ice as attractants) and gravid traps (that utilize liquid bait that attracts gravid mosquitoes). Collections will be frozen at -70°C, counted, identified, and batched. The batches will be submitted for testing to NYSDOH for the presence of arthropod-borne viruses, including West Nile.

Information on the number of mosquitoes collected, the number of batches tested, species collected and the results of the viral tests will be processed according to the trapping schedule.

- Trapping will be expanded if WNV or other arbovirus is detected in mosquitoes, birds, other animals, or humans. Information including the total number and type of mosquito (since only females spread viruses) will be collected.

- The WCDOH will use the Wadsworth Laboratory of the NYSDOH for viral testing of mosquitoes collected in Westchester County.

VERTEBRATE HOST SURVEILLANCE

Objective

To identify the presence of mosquito-borne diseases in other susceptible hosts before they are detected in humans, to permit interventions that will prevent or reduce the risk of human disease.

Background

Although an unusual number of dead or dying crows was documented in 1999, 2000 and 2001, bird mortality is not always a precursor to an arthropod-borne disease outbreak. No single sentinel host species or specific surveillance technique is effective in all areas. Therefore, the WCDOH will use complementary methods of vertebrate host surveillance as an early detection system for West Nile virus and other arthropod-borne infection and diseases.

Since certain species of mosquitoes feed abundantly on birds, avian surveillance for arbovirus among dead birds is particularly important for surveillance and control of arthropod-borne diseases. In addition, the WCDOH will improve communication with the veterinary community and others to monitor sentinel events in other animals.

Activities

- The WCDOH will monitor bird fatalities, especially among crows and other "priority" species identified by NYSDOH and CDC, as a potential marker for arbovirus activity. The WCDOH will continue to identify and work with partners in the veterinarian, wildlife rehabilitation, wildlife conservation organizations and bird watching communities, as well as utilizing members of the public, as well as County agencies and other organizations, to assist in these efforts.

- The WCDOH will ask the public to continue to report dead birds using a partially automated phone system. Data from the phone system will be analyzed to determine the number, location, and species of birds. This information will be analyzed in addition to mosquito and human surveillance data.

- In cooperation with the NYSDOH and CDC, protocols for collection and testing of dead birds have been developed. Bird specimens will be collected and sent for testing to the State's laboratory. Information on the number, location, type, and arthropod-borne virus test results will be provided. Newly deceased birds of "priority" species that have died within the previous 24-hour period, will be collected and submitted for necropsy at the Wildlife Pathology Unit. Tissue specimens obtained from necropsy will be tested for arbovirus at NYSDOH laboratories.

- In collaboration with New York State Health Department and the New York State Department of Agriculture and Markets the WCDOH will enhance communication with the veterinarian community to enhance surveillance of West Nile virus and other arthropod-borne diseases in vertebrates, especially in mammals such as horses, dogs, and cats.

HUMAN SURVEILLANCE

Objective

To quickly detect potential human cases of encephalitis due to arthropod-borne diseases and permit the initiation of interventions to reduce the risk of further transmission to humans.

Background

Viral encephalitis and meningitis are two of 70 reportable diseases and conditions in Westchester County. Most cases of encephalitis are initially diagnosed by health care providers based on a set of clinical criteria and subsequently confirmed when a laboratory test for a viral cause is positive. WCDOH will enhance the complex human surveillance infrastructure to improve diagnosis, confirmation, and reporting of encephalitis.

Activities

- The WCDOH will implement enhanced surveillance for West Nile viral encephalitis or other manifestations of mosquito-borne disease in the spring of each season during which a threat of outbreak exists. Evidence of a recurrent human outbreak would signal the need to intensify mosquito control measures to prevent further transmission.

- The WCDOH will again remind physicians countywide of their obligation to report all suspect cases of viral encephalitis and to obtain appropriate laboratory specimens to determine if an arthropod-borne virus is the cause. This will be done through the WCDOH's medical bulletin, Public Health Update, to the medical community. Subsequent issues will emphasize the importance of physician reporting in general, especially regarding unusual disease manifestations or clusters, which was key to the prompt detection of the 1999 West Nile outbreak. Copies of this bulletin will be posted on the WCDOH's website.

- From May 1 to October 1, broadcast facsimile and E-mail alerts will be sent to all County hospitals and infectious disease specialists regarding the importance of reporting suspect encephalitis cases. The WCDOH will provide the criteria for reporting and submission of appropriate laboratory specimens for arbovirus testing. To maintain physician awareness throughout the mosquito season, these alerts will be sent regularly with updated information on arbovirus activity.

- The WCDOH will conduct year-round surveillance for laboratory positive cases of mosquito-borne viruses. In the case of West Nile virus: Since West Nile virus may cross-react with SLE and other viruses on serologic testing, cases that are reported as positive for another flavivirus based on serologic testing will be retested by the NYSDOH and/or the CDC for West Nile virus by serologic (plaque reduction neutralization tests) or viral assays to differentiate which flavivirus is the likely etiologic agent.

- From July 1 to October 1, active surveillance will be conducted with weekly contact of predesignated medical staff at acute care hospitals regarding potential cases.

- The NYSDOH's laboratory will conduct diagnostic testing for arthropod-borne viral causes of encephalitis. Testing will be done using the CDC-defined IgM-capture and indirect IgG EIA tests for antibody to West Nile virus in serum and in cerebrospinal fluid specimens. The NYSDOH will also offer screening tests for other causes of viral encephalitis, such as SLE, Eastern Equine Encephalitis, and California serogroup viruses.

- The WCDOH will ensure that convalescent blood sera is obtained on all patients with encephalitis of unknown etiology if acute sera or cerebrospinal fluid is obtained less than 8 days after illness onset and is negative for arbovirus to definitively determine the presence or absence of arthropod-borne disease. Similar to activities of the 1999 outbreak, as necessary and indicated, the WCDOH will obtain convalescent blood sera from patients who are no longer hospitalized using a home phlebotomy service.

- In January 2003, the Westchester County Department of Health launched its Community Health Electronic Surveillance System (CHESS). CHESS receives daily data electronically from multiple existing information systems - including hospital emergency rooms, automatically analyzes the data to detect potential elevated levels for each syndromic category; and provides electronic reports of results. This real-time system is an important sentinel for alerting the health department to any unusual illness striking the community.

- The WCDOH will work closely with the NYSDOH and the CDC to ensure that surveillance information is standardized, secure and integrated.

PROVIDER EDUCATION

Objective

To enhance knowledge of mosquito-borne diseases among medical and veterinary professionals and to gain the cooperation of health care professionals in surveillance of mosquito-borne diseases.

Background

The early identification of the 1999 West Nile virus outbreak in humans was triggered by one concerned infectious disease physician. However, through active surveillance, we now know that at the time the physician notified the Department, there were other West Nile infected patients who were hospitalized at facilities throughout New York City. The WCDOH will improve physician awareness of mosquito-borne diseases and other infectious disease threats, whether they are endemic, imported or emerge over time.

Activities

- The WCDOH will work with physicians countywide to improve the reporting of arthropod-borne diseases. This will be done by distributing Public Health Update regularly to physicians.

- The WCDOH will work with veterinarians countywide to increase awareness, identification, and reporting of arthropod-borne diseases among animals.

- The WCDOH has instituted a single telephone number for use by providers to report diseases, including arthropod-borne diseases. A single telephone number will make access easier, and all reports can be monitored for prompt follow-up.

PUBLIC EDUCATION & OUTREACH

Objectives

1) To improve the public's awareness of the risk for vector-borne diseases and the need to eliminate potential mosquito breeding sites.

2) To provide timely and accurate information about control activities in the event of a public health threat that necessitates pesticide application.

Background

Culex pipiens, the primary vector for West Nile virus, is one of the most common mosquitoes found in urban and suburban areas. The female is a quick breeder and uses sites with standing water and decaying organic materials to lay her eggs. Prime breeding habitats include: discarded tires; unwashed bird baths; clogged rain gutters; plastic wading pools; pots and pans of standing water; inactive swimming pools; and stormwater catch basins. The WCDOH alone does not have the capacity for the timely removal of all potential mosquito habitats. The WCDOH will provide comprehensive public education and outreach to encourage residents to ameliorate sources of standing water. Informing the public of how they can reduce mosquito breeding sites is critical for the control of mosquitoes.

Another critical component of the public outreach will be communicating information about pesticide application to eliminate adult mosquitoes in the event of a public health threat. During the 1999 outbreak, the WCDOH handled more than 26,000 phone calls from the public in just six weeks; between May and October of 2000, over 54,000 calls were handled. A system for communicating information and activities to the public will be continued.

Activities

- The WCDOH will develop and air television and radio announcements that inform the public on how to reduce mosquito breeding sites around the home and how to reduce the risk of exposure to disease. The spots will air through the season.

- An educational video about elimination of mosquito breeding sites and personal protection against mosquito bites was developed and made available at no-cost loan to the public through libraries, video stores, municipal offices, and the county website.

- Brochures and fact sheets will be developed in several languages for distribution to community-based organizations, community boards, elected officials, schools, elder care facilities, libraries, outdoor activity sites, and many other organizations countywide, especially those in areas most at risk for disease occurrence.

- The WCDOH will distribute information through targeted mailings aimed toward homeowners, schools, co-op and condo owners, florists, cemetery owners, veterinarians, gas station owners, senior citizens, and owners of property with ponds.

- The WCDOH will maintain a website on www.westchestergov.com with information on arbovirus and information on mosquito control.

- An information line will provide callers with general information about arbovirus and receive reports of potential mosquito breeding sites and reports of dead birds.

- The WCDOH will work with municipalities, schools and community boards and a wide variety of organizations to provide information about breeding ground reduction.

Outbreak Plan of Action

In the event that a public health threat is identified, the WCDOH will communicate timely information to the public about spraying schedules and any potential risk associated with pesticide exposure.

- The WCDOH will issue timely press releases regarding control activities and will seek to maximize media coverage.

- The WCDOH will communicate information about spraying activities through public service advertising.

- The WCDOH will provide telephone access for the public about the nature of the disease and mosquito control measures, including spraying.

- The WCDOH's website will include up-to-date spraying schedules.

- Multilingual brochures, posters and fact sheets will be distributed countywide.

- The WCDOH will work with the Red Cross and the United Way agencies to disseminate information on arthropod-borne disease and control measures being taken in communities countywide.

- WCDOH will host regular conference calls with the 44 municipalities to update them on disease control and educational issues.

RESEARCH AND EVALUATION

Objectives

1) To better understand the transmission and pathogenicity of West Nile virus and other arthropod-borne diseases in the urban/suburban setting.
2) To assess the efficacy of disease control measures and strategies for vector control.

Background

One of the most important roles for public health professionals is to assess the potential impact of a disease on a population and to devise safe and cost-effective methods of combating the disease. The WCDOH, in collaboration with the CDC and the NYSDOH, has been studying the risk factors for acquiring West Nile virus, and subsequent morbidity and mortality. However, many questions remain about West Nile virus: how the disease was introduced to this continent, how far it has already spread, and how active it will be in future years.

Furthermore, some of the control methods for arthropod-borne diseases, especially the application of pesticides for adult mosquitoes, are not without impact, as certain individuals have heightened sensitivity to pesticides. If faced with an outbreak, the WCDOH will use the lowest levels of chemicals necessary to effectively eradicate the vector and protect the public from disease.

Activities

- The WCDOH will continue to work closely with Federal, State, and local partners to identify the most effective predictors of an outbreak in Westchester or any urban environment.

- In collaboration with NYSDOH, CDC, and NYCDOH, the WCDOH will develop a Westchester County specific stepwise response for risk categories or of mosquito-borne disease outbreaks.

- The WCDOH will evaluate the most cost-effective methods of surveillance and control.

- In coordination with the CDC, NYSDOH, and other appropriate agencies, the County will examine the reduction in adult mosquito populations after the application of adulticides (if adulticiding is determined to be necessary), as part of the long-term research and evaluation component of the *Comprehensive Plan.*

- The WCDOH will continue to work with other appropriate agencies to investigate advances in control methods and technology that may further minimize potential adverse environmental impacts.

- The County will also continue to review available information on the health impact of

pesticides.

GLOSSARY

adulticide	a type of pesticide used to kill adult mosquitoes
Aedes solicitans	species of mosquito that is not known to transmit West Nile virus; breeds in salt marshes
Altosid	brand name of methoprene, a type of larvicide
arthropod	a group of animals that do not have a backbone but have segmented legs, such as insects, spiders, and crustaceans
aseptic meningitis	inflammation of the lining of the brain and spinal cord, not due to a bacterial infection
aspirator	a suction device used to remove liquid and other material from an area
assay	a laboratory test
avian surveillance	monitoring of the bird population for presence of a disease
Bacillus sphaericus	bacterium; type of biological pesticide used to eradicate mosquito larvae in water (mosquito larvae die after ingesting this bacteria)
Bacillus thuringiensis var. israelensis (BTI)	a bacterium; type of biological pesticide used to eradicate mosquito larvae in water (mosquito larvae die after ingesting this bacteria)
case fatality rate	the percentage of persons diagnosed as having a specified disease who die as a result of that illness (proportion of cases who die of the total infected)
catch basins	grates seen at street corners for water runoff
communicable diseases	illnesses due to specific infectious agents or their toxic products that can be transmitted from an infected person or animal to a susceptible host; either directly or indirectly through an intermediate host
convalescent blood sera	blood serum collected from patients recently recovered from a disease, often used to test whether a person has had a specific infection
Culex pipiens	species of mosquito, the primary known vector for West Nile virus, commonly found in urban areas; breeds in fresh but stagnant water such as backyard containers and storm drains
DEET	DEET (chemical name, N,N-diethyl-meta-toluamide) is the active ingredient in many insect repellent products
emerging disease surveillance	monitoring of populations for the appearance of a new or re-emergent disease
encephalitis	inflammation of the brain, which can be caused by numerous viruses, including West Nile virus

endemic	the normal presence of a disease or infectious agent among human beings within a geographic area
etiologic agents	biologic organism or chemical material that cause disease
flavivirus	a subset of arboviruses (transmitted by arthropods); this family of viruses includes West Nile virus, St. Louis Encephalitis and several others
gravid traps	type of mosquito traps designed to attract fertilized female mosquitoes, i.e. looking for an oviposition site (place to lay eggs)
IgM-capture enzyme immunoassay (EIA) testing	a laboratory analysis for the presence of Immunoglobulin M antibodies (antibodies that rise during the acute phase of an illness and are a sign of recent infection)
indirect IgG enzyme immunoassay (EIA) testing	a laboratory analysis for the presence of Immunoglobulin G antibodies (long-lasting antibodies; their presence are a sign of past infection)
larvae	immature mosquitoes; stage which hatches from the egg, prior to nymph and adult stages
larvicide	a type of pesticide used to eradicate immature mosquitoes (larvae)
meningitis	inflammation of the lining of the brain and spinal cord which can be caused by a virus or a bacteria
methoprene	a type of larvicide; chemical that is used to prevent mosquito larvae from emerging and developing into adult mosquitoes
migratory birds	birds that fly south for the winter and return north in the spring
mosquito breeding site	a location where mosquitoes lay eggs, usually in stagnant water with organic material
mosquito batch	a group of mosquitoes collected in one area and combined at the laboratory for testing for the presence of West Nile and related viruses
N,N-diethyl-meta-toluamide	Chemical name of DEET (chemical name, N,N-diethyl-meta-toluamide) is the active ingredient in many insect repellent products
necropsy	autopsy on an animal
neurology	the study of the nervous system and its disorders
outbreak	an unexpected increase in frequency or distribution of a disease
overwintering	a period of rest or hibernation by which insects survive the winter
pesticide	substance used to kill pests such as insects, mice and rats; insecticide is a form of pesticide

phlebotomy	blood drawing
resmethrin	a synthetic pyrethroid pesticide used to eradicate adult mosquitoes in the home, lawn, garden and at industrial sites; active ingredient in the product Scourge
salt marsh	areas with emergent vegetation in bodies of salt water that may support the breeding of certain types of mosquitoes such as *Aedes solicitans*; examples of salt marshes are Jamaica Bay, Long Island Sound and areas in northern Queens
sentinel	birds and other animals used as an early warning system for the presence of disease
serologic	of, or relating to serum
seropositive	positive laboratory result of a serum sample
serum	liquid portion of the blood containing proteins, including antibodies
St. Louis Encephalitis (SLE)	mosquito-borne viral disease that causes inflammation of the brain; very similar to West Nile virus
sumithrin	a synthetic pyrethroid pesticide used to eradicate adult mosquitoes in swamps, marshes, and recreational areas; active ingredient in the product Anvil 10 + 10
Vectobac	brand name for larvicide *Bacillus thuringiensis var. israelensis (BTI)*
Vectolex	brand name for larvicide *Bacillus sphaericus*
vector	an organism capable of carrying and transmitting a disease-causing agent from one host to another
vector control	mechanism instituted to control and reduce the vector population
vector surveillance	monitoring of the vector population for presence of a disease
viral	of or relating to a virus
viral encephalitis	inflammation of the brain caused by a virus