

Other sources of information

Additional and more detailed information on the diagnosis and treatment of pesticide poisoning can be found in the United States Environmental Protection Agency (EPA) publication "Recognition and Management of Pesticide Poisonings, 5th edition." This publication is available as a handbook or on Compact Disc and can be also accessed on the EPA website at www.epa.gov/op-pfead1/safety/healthcare/handbook/handbook.htm

For information regarding potential chronic effects of these pesticides, you may contact the New York State Department of Health at 1-800-458-1158.

For further information about West Nile virus go to the NYS DOH website at www.nyhealth.gov



State of New York
Department of Health



New York State
Department of Health

Center for Environmental Health

FACT SHEET FOR HEALTHCARE PROVIDERS

Information related to insecticide use for preventing the spread of west nile virus

This fact sheet was prepared for health care providers to assist in answering questions that patients may have about mosquito control measures related to preventing the spread of West Nile Virus. Included in this fact sheet is information on the insecticide products that may be used, the likelihood of exposure to the insecticides, signs and symptoms of overt insecticide poisoning and what to do if a patient presents to your office with possible insecticide poisoning.

Background

The outbreak of West Nile Virus in New York State was an unprecedented event. After the 1999 outbreak, it was not certain if the virus had run its course or if the cycle of infection would begin again in subsequent years. Not only did West Nile Virus persist through the winter, the virus spread rapidly throughout New York State and much of the United States.

Insecticides have been sprayed in New York City and several counties to control adult mosquitoes. Steps to reduce mosquito breeding habitat and control mosquito larvae are ongoing. Despite these measures, it is possible that spraying to control adult mosquitoes may become necessary again if situations arise where the virus appears to be an imminent risk to human health.

More detailed information on the diagnosis and treatment of pesticide poisoning can be found in the US EPA publication "**Recognition and Management of Pesticide Poisonings, 5th edition.**" This publication can be accessed on the EPA website at: www.epa.gov/op-pfead1/safety/healthcare/handbook/handbook.htm

All confirmed or suspected cases of pesticide poisoning must be reported to the **New York State Pesticide Poisoning Registry, at 1-800-322-6850.**

Mosquito control products

Many different pesticides are registered in New York State for mosquito control. Broadly, these products can be broken down into either adulticides (those products that control adult mosquitoes) and larvicides (those products that control immature forms of mosquitoes). The pesticides that are most likely to be used for controlling adult mosquitoes in New York State and surrounding counties are:

- **sumithrin** (product name **Anvil**), and
- **resmethrin** (product name **Scourge**).

It is possible that **malathion** (product name **Fyfanon**), **naled** (product name **Dibrom**) and **permethrin** (product names **Aqua-reslin** and **Biomist**) could also be used. **Malathion** and **naled** are organophosphate insecticides. **Permethrin**, **resmethrin** and **sumithrin**, are pyrethroid insecticides. The pyrethroid products also contain **piperonyl butoxide** as a co-active ingredient. Piperonyl butoxide is added to these formulations to enhance their insecticidal activity.

Some of the larvicides that may be used are: **Bacillus sphaericus** (product name **Vectolex**) and **Bacillus thuringiensis** (product name **Vectobac**), **methoprene** (product name **Altosid**), an oily substance (product name **Arosurf**) and **temephos** (product name **Abate**).

Exposure potential to insecticides

The risk associated with the use of these products depends on the toxicity of the ingredients and the extent of exposure an individual has to them. The application rates for the active ingredients in the adulticide products are quite low, ranging from 0.0035 to 0.23 pounds per acre. As a result, exposure of the general public to adulticides is likely to be very low. Workers involved in the mixing and application of these products may have a somewhat greater potential for exposure.

Larvicides are applied to sites where the potential for human contact is very low (e.g., storm drains, sewage treatment plants, abandoned swimming pools etc.).

Pesticides are inherently toxic. However, if used properly, the potential for significant exposure to the mosquito adulticides or larvicides is low. Hence, the risk of health effects to the general public is also low.

Acute symptoms and health effects

PYRETHROIDS/ PIPERONYL BUTOXIDE INSECTICIDES

Pyrethroids, such as **permethrin**, **resmethrin**, or **sumithrin**, may be absorbed by inhalation, ingestion or skin penetration. They DO NOT cause cholinesterase inhibition. In cases of **high** exposure, signs and symptoms typical of pyrethroid poisoning may include abnormal facial sensation, dizziness, salivation, headache, fatigue, vomiting, diarrhea, and irritability to sound and touch. In more severe cases, pulmonary edema and muscle fasciculations may occur. In addition, seizures and paresthesias have been reported.

Piperonyl butoxide has limited dermal absorption on contact. Inherent acute toxicity is low. Large absorbed doses could, in theory, enhance the toxicity of some insecticides.

ORGANOPHOSPHATE INSECTICIDES

Malathion and **naled** are organophosphate insecticides that can be absorbed by inhalation, ingestion, and skin penetration. In cases of **high** exposure, organophosphates may cause cholinesterase inhibition. Significant cholinesterase inhibition may result in a spectrum of cholinergic symptoms. Early symptoms of **overt** poisoning often include headache, nausea, dizziness, miosis, sweating, salivation, lacrimation and rhinorrhea. As the condition worsens, muscle twitching, weakness, tremor, incoordination, abdominal cramps, vomiting, diarrhea, anxiety, restlessness, depression and memory loss may occur. In addition, bradycardia, bronchospasm, and bronchorrhea are possible. Loss of consciousness, incontinence, convulsions and respiratory depression indicate a life-threatening severity of poisoning.

In children with **high** exposure resulting in organophosphate poisoning, seizures and mental status changes including lethargy and coma are common. Presenting signs in such cases often include flaccid muscle weakness, miosis and excessive salivation.

Additional considerations

Although most people are not expected to experience any symptoms given the low anticipated levels of exposure, some individuals may be particularly sensitive to the pesticide products or their carriers, which may include petroleum solvents. Such individuals could experience short-term effects, such as skin, eye and mucous membrane irritation, as well as exacerbation of such conditions as asthma.

As with chemical exposures in general, pregnant women should take care to minimize exposures when possible, as the fetus may be vulnerable.

Recommendations for management

Diagnostic tests, including blood and plasma cholinesterase levels, are often used in cases of acute organophosphate poisoning, to assist with treatment and follow-up. However, it is unlikely that these tests would be necessary or useful with the anticipated levels of exposure from West Nile Virus control activities. The results of cholinesterase tests are highly variable among individuals, and isolated tests on individuals with suspected exposure would not indicate the extent of exposure or health effects. These tests are more meaningful when a baseline level is available for comparison, as might be the case for chronically exposed agricultural workers undergoing periodic surveillance.

If a patient presents with signs and symptoms consistent with pesticide poisoning, the local Poison Control Center should be contacted at 1-800-222-1222 for advice on the appropriate course of action. In addition, all confirmed or suspected cases of pesticide poisoning must be reported to the New York State Pesticide Poisoning Registry at 1-800-322-6850.