Protection Strategies Against West Nile Virus
Habitat Control and Personal Protection Strategies

Preventing West Nile Virus (WNV)

The basis of preventing WNV in Scouts, Scouters, and camp staff is a two-pronged program directed at mosquito reduction and personal protection. By far the most important aspect **is** personal protection. The Department of Defense system of personal protection consists of treating clothing with 0.5% permethrin and treating exposed body surface areas with DEET. Properly used, this combination can reduce the incidence of mosquito bites by virtually 100 percent.

Background

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West Nile Virus (WNV) was first identified in a patient in Uganda in 1937. In August 1999, two cases of this disease were found in patients in Queens, New York. @V spread to 44 states and the District of Columbia by the end of 2002, with thousands of cases of severe disease and more than 200 deaths.

For every five humans infected with the virus, one has a mild, febrile illness lasting, 3 to 6 days, while approximately one in 150 infected persons develops meningitis or encephalitis. The incubation period ranges from 2 to 14 days. Mild illness may include lethargy, eye pain, nausea, cramping and a rash. Severe muscle weakness is also frequently a symptom.

WNV develops in humans from infected mosquito bites. Birds act as an intermediate host, forming a reservoir of infection. Migrating birds introduce the WNV into local ecosystems where it may then continue to reside in wintering species of mosquitoes **in** some areas of the country, or be reintroduced to new hatches of mosquitoes in the spring

Maps indicating the current spread of WNY can be found at the U.S. Geological Survey Internet site: http://cindl.usgs.gov/hazard/event/west-nile/west-nile.html.

Mosquito Reduction Methods

The term ***source reduction*** refers to altering habitats that temporarily hold water. Community mosquito control agencies do so by clearing culverts, storm water collection structures, roadside ditches, etc., and by altering water flows in salt marshes. It is important to prevent buckets, tires, and other such items from collecting water. Birdbaths should be rinsed weekly because mosquito larvae (the aquatic stage) require only 1 week to develop to adults. One tire can produce thousands of mosquitoes in one summer.

Because mosquitoes tend not to fly far, those produced on camp property will remain a nuisance to the immediate area.

The camp property abatement plan should include the following:

- Repair failed septic systems.
- Keep grass cut short and shrubbery trimmed.
- Dispose of old tires, cans, plastic containers, ceramic pots, or other unused containers that can hold water

· For those containers that must remain on your property, such as birdbaths and wading pools, change the water at least once a week.

Cover trash containers to keep out rainwater

Clean clogged roof gutters, particularly if leaves tend to clog the drains

Repair leaky water pipes and outside faucets.

Aerate ornamental pools or stock them with predatory fish

Clean and chlorinate swimming pools even if they are not being used

Keep drains, ditches, and culverts free of grass clippings, weeds, and trash so water will drain properly.

Larviciding refers to killing larvae before they become adults. Community control programs do so by applying environmentally benign products to habitats that, for various reasons, cannot be drained. While homeowners can purchase BTI - an environmentally benign, slow -release briquette product, source reduction is usually the more appropriate tactic on camp property.

Adulticiding refers to killing adult mosquitoes. Community control programs do so by spraying from trucks or backpack foggers. This is the method of last resort because adults are dispersed and no environmentally benign products are available to kill adult mosquitoes. All adulticides will kill other beneficial insects that receive sufficient dosages. Also, ground-based spraying has limited effectiveness in both space and time. However, various equine encephalitis outbreaks and @V emergencies can warrant ground and/or aerial spraying to quickly reduce a human health threat.

Individual state incidence information on ANV and points of contact with local health authorities for specific advice on local risk of disease and help with issues of mosquito abatement procedures can be found for each state at: http://www.cdc.gov/ncidod/dvbid/westnile/city_states.htm

Personal Protection Technique

Clothing protection with permethrin is safe and effective for up to 6 weeks. Spraying 0.5% permethrin on the cloth until the material is damp treats the clothing adequately. Spray outdoors and allow to dry before wearing. This water-based substance is safe for all fabrics, natural and synthetic. The chemical does not absorb through skin and is nonirritating. The impregnated fabric can withstand multiple washings or wetting (such as

rain or immersion while swimming) over a 6-week period before requiring re-application. A video demonstration of how to apply permethrin to clothing prepared for consumers can be found at: http://www.sawyeronline.com/news.htm

Permethrin has a high safety factor because it breaks down when exposed to human skin due to an enzyme action. This rapid metabolic degradation, together with incomplete absorption, contributes to the low acute toxicity of the synthetic pyrethrolds.[2] This generic product can be found in camping specialty stores and major drug store and retail stores throughout the United States.

An insect repellent containing DEET should be used on exposed skin surfaces when mosquitoes are present. Low absorption formulations of DEET are available. It is preferable to use a DEET concentration of not more than 35%. DEET is the most effective and best studied insect repellent on the market with a remarkable safety profile after 40 years of worldwide use.'

When applying DEET, care must be taken to avoid allowing the repellent to contact the eyes or mouth. DEET can also dissolve some synthetic materials. If sun block is also necessary, apply the DEET lotion

after applying sun block. Weak solutions of DEET (less than 10 percent) will have to be frequently re-applied where there are heavy mosquito concentrations. Under these conditions the higher concentrations offer superior protection. Controlled release and composite formulations of DEET can be very effective in concentrations of 12 to 20 percent (3M Ultrathion, Sawyer Controlled Release), but otherwise, 30 to 35 percent DEET concentrations are the most appropriate for use in high-density mosquito zones.

A consumer site that discusses DEET application strategies for youngsters and children can be found at: http://www.docforgey.com/protection/index.html.

A [1] page document prepared by the Centers for Disease Control that discusses WNV prevention strategies can be downloaded in Adobe Acrobat format from: http:http://www.cdc.gov/ncidod/dvbid/westnile/resources/wnv-guidelines-apr-2001.pdf

[1] Fradin, MS. Mosquitoes and mosquito repellents: a clinician's guide. Ann Intern Med (I 998 Jun 1) 128 (11):931-40.
[2] Miyamoto, J. Degradation, metabolism and toxicity of synthetic pyrethroids. Environ Health Perspect (1976) 14:14-28