



Fight the bite!

CALIFORNIA DEPARTMENT OF
PESTICIDE REGULATION

Protecting outdoor workers

Mosquitoes can carry diseases, including West Nile virus. The best way to avoid infection is to avoid being bitten. At greatest risk are individuals who are outdoors when mosquitoes are most active: at dawn, sunset and early evening. This includes farmworkers, groundskeepers and gardeners, painters, construction workers, road crews, and mechanics, among others. There is a lot employers and employees can do to make outdoor work safer.

WHAT EMPLOYERS CAN DO

- When possible, schedule work so employees are not outdoors when mosquitoes are most active: between dusk and dawn.
- Mosquitoes can grow in any puddle of water that stands for more than four days. Eliminate as many sources of standing water as possible – they are mosquito-breeding areas:
 - > Get rid of containers (no matter how small) that have standing water.
 - > Remove debris – like leaves, twigs, and trash – from ditches.
 - > Turn over, cover tightly, or remove equipment such as tarps, buckets, barrels, dumpsters, cans, wheelbarrows, tires, and other containers that accumulate water. When this is not practical, drill drain holes in the containers.
 - > Use aeration, if you can, to prevent mosquito growth in ponds, animal feeding and drinking troughs, and other bodies of standing water. Change water in animal feeders every few days. You can also use mosquito dunks, small doughnut-shaped blocks that dissolve slowly in water. Available in hardware and garden stores, they contain BTi, a pesticide that kills mosquito larvae but is non-toxic to animals and fish.
- Train workers who may be at risk. Training should cover the potential risks of West Nile virus exposure and what employees can do to protect themselves.
- Make insect repellents available to workers. For exposed skin, the U.S. Centers for Disease Control and Prevention (CDC) recommends products containing DEET (N,N-diethyl-m-toluamide) or picaridin (KBR 3023), because they provide the longest protection. The CDC also recommends permethrin (an insecticide, not a repellent) to apply on clothing only. Read the label to find the active ingredient, and use all products according to label directions.
- Recommend that outdoor workers wear long-sleeved shirts, long pants, and socks, when possible. In hot weather, pants and jackets made of insect netting can be worn. Such clothes are available in sporting good stores and through outdoor equipment catalogs.
- The virus can infect birds and other animals. Instruct employees not to handle dead birds or animals, or if they do, to use a shovel, gloves or an inverted plastic bag.

WHAT WORKERS CAN DO

You can reduce your risk of becoming infected with West Nile virus by reducing your contact with mosquitoes. The three key steps:

- Reduce mosquito-breeding areas by getting rid of standing water. Tip over wheelbarrows, buckets and other containers when not being used so they do not collect standing water.
- Wear shoes, long pants tucked into boots or socks, and a long-sleeved shirt.
- Use mosquito repellent when outdoors for long periods or when mosquitoes are most active (dawn, sunset, and early evening).

Insect repellents are effective and safe when used according to label directions. Problems can occur if they are applied in large amounts or improperly. For skin, the U.S. Centers for Disease Control recommends products containing DEET (N,N-diethyl-m-toluamide) or picaridin (KBR 3023), because they provide the longest protection.

- Choose among repellent products based on how long you are going to be outside, and what you will be doing. Use a higher-percentage product if you will be outdoors for several hours, or if you will be sweating or physically active. For longer protection without having to apply a high-concentration product, use a microencapsulated formula. (Look for “time release” or “controlled release” on the label).
- If your time outdoors will be limited, reduce any risk of adverse reactions by using a lower-percentage product. You can always re-apply it if you are outdoors longer than expected.
- Heavy application is not necessary. Cover all exposed skin, however, since repellents only work a few inches above treated skin.
- Don’t apply repellent to cuts, irritated or sunburned skin. Do not apply **under** clothing.
- Don’t spray aerosol or pump products in enclosed areas. Avoid breathing the spray, and don’t spray near food.
- Don’t spray products directly on your face. Spray your hands and then rub over the face, avoiding eyes and mouth.
- Wash treated skin after returning indoors. This is particularly important if you will be reapplying repellent repeatedly over a day or several days.

Double up your protection by covering up. Wear light-colored, long, loose clothing. Tuck your pants into your socks.

Since mosquitoes can bite through tight or thin clothing, also treat your clothes with repellent. Check the label to make sure the product will not damage fabric.

In hot weather when wearing long clothing isn’t feasible, wear pants and jackets made of insect netting. Such clothes are available in sporting good stores and through outdoor equipment catalogs.

Under demanding conditions, when you have to spend a long time outside and mosquito populations are high, health officials advise a two-step strategy. First, treat exposed skin with a repellent product containing about 33 percent DEET in a microencapsulated, controlled-release formulation. (Read the label to find out the active ingredient and its percentage.) Second, treat your clothing with permethrin, an insecticide that kills mosquitoes that come in contact with it. Permethrin cannot be used on skin, only clothing.

There are some health concerns associated with permethrin products. However, if used according to label directions, the potential for adverse reactions is minimized. Some recommendations for proper permethrin use are:

- Read and follow label directions exactly.
- Treat clothing only – never apply permethrin to your skin. If you get it on your skin, immediately wash with soap and water.
- Spray outer surface of clothing before you put it on, lightly moistening the fabric – do not saturate. Hang treated clothing outdoors for at least two hours before wearing.
- If you spend a lot of time in mosquito-infested areas, you may want a set of clothes that you only use there. Treat these clothes – preferably, long-sleeved shirt, pants, and socks – with permethrin according to the label directions, wear them only when needed, and then place in a separate, plastic bag between uses. Permethrin can work for two weeks or more if the clothing is not washed.

This fact sheet was adapted from documents developed by the National Institute for Occupational Safety and Health and the New York Department of Health.