



# Fight

CALIFORNIA DEPARTMENT OF  
PESTICIDE REGULATION

the **bite!**

## Protect your family – use a repellent

Biting insects are more than a nuisance. Mosquitoes can carry diseases that infect humans and animals, including West Nile virus. West Nile virus is a potentially serious disease now established in California. The way most people get infected is through a mosquito bite. A few simple precautions can protect you and your family.

### HOW DO I AVOID MOSQUITO BITES?

- Make sure door and window screens are “bug tight.”
- Don’t grow your own mosquitoes. Get rid of containers (no matter how small) that have standing water.
- Stay indoors when mosquitoes are most active: dawn, sunset and early evening. If you must go outdoors then, first apply repellent.
- The safest approach is to apply repellent **whenever** you are outdoors, even for a short time. Choose among repellents based on how long you plan to be outside and what you will be doing. When you are sweating, physically active or getting wet, repellents don’t last as long.
- No repellent provides complete protection, so cover up. Wear light-colored, long, loose clothing. Tuck your pants into your socks. Mosquitoes can bite through thin or tight clothes, so spray your clothing with repellent. (Check the label to make sure it won’t damage clothes.)
- If it’s too hot for long sleeves and pants, wear clothing made of insect netting, which you can buy in sporting good stores and through outdoor equipment catalogs.

### WHICH MOSQUITO REPELLENTS WORK BEST?

The Department of Pesticide Regulation (DPR) recommends using only products registered as repellents with DPR and the U.S. Environmental Protection Agency (U.S. EPA). Registered products have been reviewed for effectiveness and safety, when used according to label directions. Look on the label for a U.S. EPA registration number.

According to the U.S. Centers for Disease Control and Prevention (CDC), of the registered active ingredients, two provide longer-lasting protection in peer-reviewed, scientific studies. Look on the product label for one of these active ingredients:

- DEET (N,N-diethyl-m-toluamide)
- Picaridin (KBR 3023)

CDC also recommends oil of lemon eucalyptus (p-methane 3,8-diol, or PMD), a plant-based registered repellent that provides protection similar to a low concentration of DEET.

On the other hand, recent studies of other plant-based repellents (such as oil of geranium, lavender, peppermint, clove, thyme and citronella) found that only a few high-concentration oils provided protection, and then only for a short time. These concentrated oils are more likely to cause allergic skin reactions. In addition, products that are not registered with U.S. EPA have not been studied for long-term effects that may occur with frequent application.

### HOW DO I CHOOSE A REPELLENT?

To reduce any risk of adverse effects, you should use the lowest-concentration product you can for your situation.

- Use a higher-percentage product if you will be outdoors for several hours, or if you will be sweating, physically active, or getting wet. For longer protection without using a high-concentration product, apply a microencapsulated formula. (Look for “time release” or “controlled release” on the label).

- If your time outdoors will be limited, use a lower-percentage product. You can always re-apply it if you are outdoors longer than expected.
- If you are using a DEET product, one with a concentration of 30 percent or less is fine for most situations.
- There are no additional restrictions on the use of registered repellent products by pregnant or lactating women.

### WHAT REPELLENTS ARE BEST FOR CHILDREN?

Consider how much time a child will be outdoors, exposure to mosquitoes, and the risk of mosquito-transmitted disease in your area. Read repellent labels – and then use the lowest-concentration product for your situation. You can ask your physician, and also get information from the National Pesticide Information Center, 1-800-858-7378.

You can use DEET on children, and on infants older than 2 months. The American Academy of Pediatrics recommends selecting DEET products with concentrations of 30 percent or less. Picaridin and lemon eucalyptus products can also be used on children, but double-check the label – some should not be used on children under 3. If you are not using repellent, put mosquito netting over baby carriers, playpens and strollers.

### HOW DO I USE REPELLENTS?

Read the label and do what it says. Generally:



- Apply lightly but cover all exposed skin.
- Don't apply **under** clothing. You can apply repellent **on** clothing, but read the label – some repellents stain fabrics.
- Do not apply to cuts, irritated or sunburned skin.
- Don't spray 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 your face, avoiding eyes and mouth.
- After you are back indoors, wash treated skin with soap and water. This is especially important if you are applying repellents repeatedly in a day or over several days.

#### When you use repellents on children:

- Don't let young children apply repellent themselves. Apply the repellent on your hands first and then rub on your child. Avoid the eyes and mouth.
- Don't apply repellent to young children's hands as they may put their hands in their mouths.

### CAN I USE A REPELLENT AND SUNSCREEN?

Yes. Apply the sunscreen, then the repellent. Follow the instructions for proper application of each.

Many healthcare professionals advise against using a repellent product that also contains a sunscreen. The application instructions are incompatible. Sunscreens should be applied liberally and frequently, while repellents should be applied lightly. Keep in mind too that you need sunscreen most in the heat of the day, when mosquitoes are typically not active.

### ARE REPELLENTS SAFE?

DEET is the most widely available and extensively tested repellent. U.S. EPA's evaluation concluded, "Normal use of DEET does not present a health concern to the general population." Serious reactions have been related to using DEET against the instructions, such as swallowing it, using over broken skin, or using it multiple days without washing skin between uses.

DEET and lemon eucalyptus products can damage fabrics, leathers and plastics. Picaridin is as effective as DEET, in tests, and is safer for fabrics.

With any product, follow the instructions – using more than the label says won't give you extra protection but may increase risk.

### HOW DO REPELLENTS WORK?

Repellents don't kill bugs. Most work by creating a vapor barrier a few inches above the application area. This shield is designed to block the mosquito's ability to home in on your skin. For the barrier to be effective, all exposed skin must be covered.

Repellents work for a short distance. Even though you have applied repellent, you may see mosquitoes around. If mosquitoes aren't landing on you, you don't need to re-apply repellent.

### MOSQUITO TRAPS OR OTHER DEVICES?

In tests, traps that use carbon dioxide (CO<sub>2</sub>) have been effective at reducing mosquito populations in the immediate area. On the other hand, university studies have repeatedly demonstrated that ultrasonic repellents (that emit high-frequency sound) and bug "zappers" (bugs attracted to a light are electrocuted) do not reduce mosquito numbers.

### WHAT IF I HAVE A REACTION TO A REPELLENT?

Wash treated skin with soap and water and remove treated clothing. Then call your doctor. You can also get free advice from your poison control center, 1-800-222-1222. If you go to a doctor, take the repellent container with you.

### MORE QUESTIONS?

Call the National Pesticide Information Center, 1-800-858-7378, or on the Web at <http://npic.orst.edu>. You can also get information from the Centers for Disease Control, [www.cdc.gov/westnile](http://www.cdc.gov/westnile).