

Basic Facts About Repellents



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- ▶ The primary active ingredients registered by the EPA for use in insect repellents are: DEET, picaridin, oil of lemon eucalyptus, IR3535 and catnip oil. All of these are effective against mosquitoes at equivalent concentrations. The EPA registration on each product label appears near the bar code. (See illustration above.) Registration occurs only after the EPA determines that the active ingredient in the repellent product meets standards for effectiveness and is unlikely to affect human health or the environment when the product is used according to label directions.
- ▶ Generally, the higher the concentration of active ingredient in the product, the longer the protection time. So, more is not 'better', it's 'longer'. A 10% DEET-based product helps to protect from mosquito bites for about 90 minutes. A 30% product may work for up to eight hours, depending on a variety of factors, including how heavily the user is perspiring. Keep in mind, however, that protection times may be shorter for repelling ticks than for mosquitoes.
- ▶ The American Academy of Pediatrics issued guidance in 2003 on the use of DEET-based repellents, noting that children as young as two months of age can use repellents with up to a 30% concentration. This should help to reassure parents that their youngsters can use these products with confidence. The minimum age recommendations are the same for picaridin and IR3535. Children must be at least three years old to use oil of lemon eucalyptus products.
- ▶ Repellents are for use on exposed skin and, in the case of ticks, on clothing. They are not intended for use on screens or other environmental surfaces. They should not be sprayed on the insects or ticks (won't kill them!), and should be reapplied only when the bugs start biting again.
- ▶ Applying repellents by spraying the air AROUND your body will not work. Products should be applied directly to the skin, then smoothed on to get even coverage just as you would apply a sunscreen or body lotion. (A mosquito can find a spot the size of a dime that is not protected and will bite there.) Many people spray repellent on their hands and then smooth

it on exposed skin on arms, legs, neck, etc. This is the recommended method for applying to very young children.

- ▶ Children should not apply repellent to themselves or others until they are able to read, understand and follow label directions. Repellent can be reapplied if needed.
- ▶ Clip-on repellent products work **ONLY** when the air is still and the wearer is not moving. The active ingredient is an insecticide. Citronella candles and similar devices, according to the leading experts, do not work.
- ▶ When using repellent at the same time you need to apply a sunscreen, apply the sunscreen first. Allow it to fully absorb into the skin, then apply repellent. Reapply sunscreen often. Reapply repellent only when bugs start biting again.
- ▶ The most commonly-reported adverse event associated with DEET-based repellents is stinging when the product gets into the eyes. Most formulations contain alcohol and DEET itself can be an eye-irritant. If this happens, rinse eyes with fresh water and the problem is resolved quickly.
- ▶ Repellents are not needed *under* clothing unless mosquitoes are able to bite through the fabrics. For protection from ticks, spray repellent lightly on shoes, socks and pant legs...and of course on all exposed skin.

More information

For more information on repellents and the various vector-borne diseases that you may encounter, call (800) 789-3300 or visit the website for the DEET Education Program, www.repellentinfo.org. Look here, too, for proper application information.

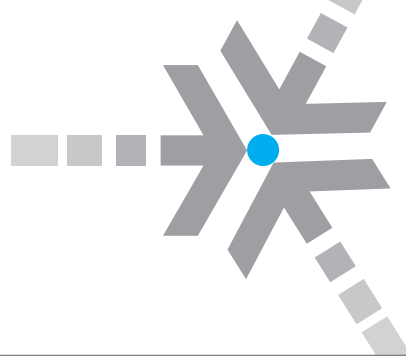
The Centers for Disease Control and Prevention, www.cdc.gov/ticks or www.cdc.gov/westnile has information on ticks and mosquitoes and the diseases they convey to humans. See also <https://www.cdc.gov/zika/>

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The DEET Education Program operates under the auspices of the Household & Commercial Products Association.

CONCENTRATION



“Concentration” is the amount of active ingredient found in insect repellent products. Often, consumers assume “more” means “better,” but that’s not the case. Lower concentration products work just as well as those with higher concentrations. The higher concentrations work longer, when used according to label directions.

So which concentration is best for mosquitoes?

The amount of active ingredient in repellents ranges from 5% to 100%. Lower concentration products help repel mosquitoes for an hour or so. But, there are many variables that affect the duration of efficacy—including product formulation, gender, body chemistry, level of activity/perspiration, humidity and other factors.

For exposures in the U.S., most experts suggest products ranging up to and including 30% concentration for duration of efficacy for up to about eight hours. Formulation can be important, however, because a sustained release DEET-based product with 34.5% concentration lasts up to 12 hours, which is comparable to 100% DEET. For guidance, read product labels and/or visit <https://www.epa.gov/insect-repellents/find-insect-repellent-right-you>

Whenever possible, match the product with the length of time you’ll be exposed. For a backyard barbecue, a 10% product containing an EPA-registered active ingredient should provide up to two hours of protection from bites. When hiking, fishing or engaging in other activities that mean being outside for several hours in areas where mosquitoes are active, consider using a 15% sweat-resistant formulation or other products with up to a 30% DEET-based concentration. These provide approximately five to eight hours of repellent efficacy, respectively. Experts who have published comparative studies on repellent efficacy recommend a minimum 25% concentration DEET-based product if you’ll be exposed to *Aedes aegypti* mosquitoes. These mosquitoes can transmit Zika virus, dengue, and/or chikungunya.

What happens if mosquitoes start biting again?

Reapply the product, according to label directions.

What about protection from ticks?

For mosquitoes, each of the six EPA-registered active ingredients offers similar periods of protection at similar concentrations. Generally, the higher the concentration of active ingredient in the product, the longer the protection time. So, more is not ‘better’, it’s ‘longer’. Keep in mind, however, that protection times may be shorter for repelling ticks than for mosquitoes.

What concentration should be used on children?

The EPA does not impose age restrictions on repellent products except for oil of lemon eucalyptus, noting that children must be three years of age or older to use products with this active ingredient. Guidance from the American Academy of Pediatrics (AAP) issued in 2003 is that DEET-based products with up to a 30% concentration can be used on children as young as two months of age. The EPA and CDC both cite this AAP guidance for DEET on their websites.

What about pregnant women or those contemplating becoming pregnant?

The CDC and EPA recommend using repellents containing EPA-registered active ingredients on exposed skin according to label directions in areas in the U.S. where West Nile virus is endemic and for travel to areas where Zika virus is active.

What are the EPA-registered active ingredients?

They are: DEET, picaridin, IR3535, oil of lemon eucalyptus, catnip oil and 2-undecanone.

How do you determine what the active ingredient is in a given repellent product?

Look on the front panel for the name of the active ingredient. The concentration will be shown opposite the ingredient name.



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For additional questions on repellents and their use, contact:

DEET
EDUCATION
PROGRAM
(800) 789-3300
www.repellentinfo.org

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