

West Nile Virus: Insect Repellent Use and Safety

Q. Is DEET safe?

A. Yes, products containing DEET are very safe when used according to the directions. Because DEET is so widely used, a great deal of testing has been done. When manufacturers seek registration with the U.S. Environmental Protection Agency (EPA) for products such as DEET, laboratory testing regarding both short-term and long-term health effects must be carried out. Over the long history of DEET use, very few confirmed incidents of toxic reactions to DEET have occurred when the product is used properly.

Insect Repellents and Sunscreen

Q. Can I use an insect repellent containing DEET and sunscreen at the same time?

A. Yes. People can and should use both sunscreen and DEET when they are outdoors to protect their health. Follow the instructions on the package for proper application of each product. Apply sunscreen first, followed by repellent containing DEET.

To protect from sun exposure and insect bites, you can also wear long sleeves and long pants. You can also apply insect repellent containing DEET or permethrin to your clothing, rather than directly to your skin.

Q. Has CDC changed its recommendations for use of DEET and sunscreen?

A. No. Based on available research, CDC believes it is safe to use both products at the same time. Follow the instructions on the package for proper application of each product. Apply sunscreen first, then insect repellent containing DEET, to be sure that each product works as specified.

Q. Should I use a combination sunscreen/DEET-based insect repellent?

A. Because the instructions for safe use of DEET and safe use of sunscreen are different, CDC does not recommend using products that combine DEET with sunscreen.

In most situations, DEET does not need to be reapplied as frequently as sunscreen. DEET is very safe when applied correctly. The rare adverse reactions to DEET have generally occurred in situations where people do not follow the product instructions. Sunscreen often requires frequent reapplication, so using a combined product is not recommended. You do not need to reapply insect repellent every time you reapply sunscreen. Follow the instructions on the package for each product to get the best results.

Q. I heard about a study saying that there may be some type of interaction between repellents containing DEET and sunscreen. Is this true?

A. There has been attention to a study concerning the chemicals in DEET and sunscreen presented at a scientific meeting. This is an in vitro study, which means that it is a laboratory study that did not include human or animal testing. The goal of the study was to examine absorption of these chemicals, and it did not evaluate or make conclusions about health effects related to this issue. The study authors stated that further evaluation of the interaction of these chemicals should be conducted. The study has not yet been published (as of July 2003).

Evaluation by the EPA, which regulates products such as DEET, indicates that it is safe to use insect repellents containing DEET and sunscreen at the same time. CDC recommends using two separate products because sunscreen requires frequent applications while DEET should be used sparingly. Follow the directions on the package for each product, and consult your physician or pharmacist if you have questions. CDC's recommendations for the safe use of insect repellents on children and adults remain unchanged.

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Insect Repellent Use

Q. Why should I use insect repellent?

A. Insect repellents help people reduce their exposure to mosquito bites that may carry potentially serious viruses such as West Nile virus, and allow them to continue to play and work outdoors.

Q. When should I use mosquito repellent?

A. Apply repellent when you are going to be outdoors and will be at risk for getting bitten by mosquitoes.

Q. What time of day should I wear mosquito repellent?

A. Many of the mosquitoes that carry the West Nile virus are especially likely to bite around dusk and dawn. If you are outdoors around these times of the day, it is important to apply repellent. In many parts of the country, there are mosquitoes that also bite during the day, and these mosquitoes have also been found to carry the West Nile virus. The safest decision is to apply repellent whenever you are outdoors.

Q. How often should repellent be reapplied?

A. Follow the directions on the product you are using in order to determine how frequently you need to reapply repellent. Sweating, perspiration or getting wet may mean that you need to re-apply repellent more frequently. If you are not being bitten, it is not necessary to re-apply repellent. Repellents containing a higher concentration of active ingredient (such as DEET) provide longer-lasting protection.

Q. Should I wear repellent while I am indoors?

A. Probably not. If mosquitoes are biting you while you are indoors, there are probably better ways to prevent these bites instead of wearing repellent all the time. Check window and door screens for holes that may be allowing mosquitoes inside. If your house or apartment does not have screens, a quick solution may be to staple or tack screening (available from a hardware store) across the windows. In some areas community programs can help older citizens or others who need assistance.

Q. How does mosquito repellent work?

A. Female mosquitoes bite people and animals because they need the protein found in blood to help develop their eggs. Mosquitoes are attracted to people by skin odors and carbon dioxide from breath. Many repellents contain a chemical, N,N-diethyl-m-toluamide (DEET), which repels the mosquito, making the person unattractive for feeding. DEET does not kill mosquitoes; it just makes them unable to locate us. Repellents are effective only at short distances from the treated surface, so you may still see mosquitoes flying nearby. As long as you are not getting bitten, there is no reason to apply more DEET.

Q. Which mosquito repellent works the best?

A. The most effective repellents contain DEET (N,N-diethyl-m-toluamide), which is an ingredient used to repel pests like mosquitoes and ticks. DEET has been tested against a variety of biting insects and has been shown to be very effective. The more DEET a repellent contains the longer time it can protect you from mosquito bites. A higher percentage of DEET in a repellent does not mean that your protection is better—just that it will last longer. DEET concentrations higher than 50% do not increase the length of protection.

Q. How does the percentage of DEET in a product relate to the amount of protection it gives?

A. Based on a recent study:

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- A product containing 23.8% DEET provided an average of 5 hours of protection from mosquito bites.
- A product containing 20% DEET provided almost 4 hours of protection
- A product with 6.65% DEET provided almost 2 hours of protection
- Products with 4.75% DEET and 2% soybean oil were both able to provide roughly 1 and a half hour of protection.

Choose a repellent that provides protection for the amount of time that you will be outdoors. A higher percentage of DEET should be used if you will be outdoors for several hours while a lower percentage of DEET can be used if time outdoors will be limited. You can also re-apply a product if you are outdoors for a longer time than expected and start to be bitten by mosquitoes.

Q. Why does CDC recommend using DEET?

A. DEET is the most effective and best-studied insect repellent available. (Fradin, 1998). Studies using humans and mosquitoes report that only products containing DEET offer long-lasting protection after a single application.

Q. Are non-DEET repellents effective (e.g. Skin-So-Soft, plant-based repellents)?

A. Some non-DEET repellent products which are intended to be applied directly to skin also provide some protection from mosquito bites. However, studies have suggested that other products do not offer the same level of protection, or that protection does not last as long as products containing DEET. A soybean-oil-based product has been shown to provide protection for a period of time similar to a product with a low concentration of DEET (4.75%).

People should choose a repellent that they will be likely to use consistently and that will provide sufficient protection for the amount of time that they will be spending outdoors. Product labels often indicate the length of time that protection that can be expected from a product. Persons who are concerned about using DEET may wish to consult their health care provider for advice. The National Pesticide Information Center (NPIC) can also provide information through a toll-free number, 1-800-858-7378 or npic.orst.edu.

Q. I'm confused. Which products contain "DEET"?

A. Most insect repellents that are available in stores are labeled with the chemical name for DEET. Look for N,N-diethyl-m-toluamide or, sometimes, N,N-diethyl-3-methylbenamide. Choose a repellent that offers appropriate protection for the amount of time you will be outdoors. A higher percentage of DEET should be used if you will be outdoors for several hours while a lower percentage of DEET can be used if time outdoors will be limited.

Using Repellents Safely

Q. What are some general considerations to remember in order to use products containing DEET safely?

- A.** Always follow the recommendations appearing on the product label.
- Use enough repellent to cover exposed skin or clothing. Don't apply repellent to skin that is under clothing. Heavy application is not necessary to achieve protection.
 - Do not apply repellent to cuts, wounds, or irritated skin.
 - After returning indoors, wash treated skin with soap and water.
 - Do not spray aerosol or pump products in enclosed areas.
 - Do not apply aerosol or pump products directly to your face. Spray your hands and then rub them carefully over the face, avoiding eyes and mouth.

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Q. How should products containing DEET be used on children?

A. No definitive studies exist in the scientific literature about what concentration of DEET is safe for children. No serious illness has been linked to the use of DEET in children when used according to the product recommendations. The American Academy of Pediatrics (AAP) Committee on Environmental Health has recently updated their recommendation for use of DEET products on children, citing: "Insect repellents containing DEET (N,N-diethyl-m-toluamide, also known as N,N-diethyl-3-methylbenzamide) with a concentration of 10% appear to be as safe as products with a concentration of 30% when used according to the directions on the product labels."

The AAP and other experts suggest that it is acceptable to apply repellent with low concentrations of DEET to infants over 2 months old. Other guidelines cite that it is acceptable to use repellents containing DEET on children over 2 years of age.

Parents should choose the type and concentration of repellent to be used by taking into account the amount of time that a child will be outdoors, exposure to mosquitoes, and the risk of mosquito-transmitted disease in the area. Persons who are concerned about using DEET or other products on children may wish to consult their health care provider for advice. The National Pesticide Information Center (NPIC) can also provide information through a toll-free number, 1-800-858-7378 or npic.orst.edu.

Always follow the recommendations appearing on the product label when using repellent.

- When using repellent on a child, apply it to your own hands and then rub them on your child. Avoid children's eyes and mouth and use it sparingly around their ears.
- Do not apply repellent to children's hands. (Children may tend to put their hands in their mouths.)
- Do not allow young children to apply insect repellent to themselves; have an adult do it for them. Keep repellents out of reach of children.
- Do not apply repellent to skin under clothing. If repellent is applied to clothing, wash treated clothing before wearing again.

Using repellents on the skin is not the only way to avoid mosquito bites. Children and adults can wear clothing with long pants and long sleeves while outdoors. DEET or other repellents such as permethrin can also be applied to clothing (don't use permethrin on skin), as mosquitoes may bite through thin fabric. Mosquito netting can be used over infant carriers. Finally, it may be possible to reduce the number of mosquitoes in the area by getting rid of containers with standing water that provide breeding places for the mosquitoes.

Q. Is DEET safe for pregnant or nursing women?

A. There are no reported adverse events following use of repellents containing DEET in pregnant or breastfeeding women.

Q. Are there any risks due to using repellents containing DEET?

A. Use of these products may cause skin reactions in rare cases. If you suspect a reaction to this product, discontinue use, wash the treated skin, and call your local poison control center. There is a new national number to reach a Poison Control Center near you: 1-800-222-1222.

For more information, visit www.cdc.gov/westnile, or call the CDC public response hotline at (888) 246-2675 (English), (888) 246-2857 (Español), or (866) 874-2646 (TTY)