



Insect Protection



Environmental Protection Agency (EPA) Registered Insect Repellents for use on skin:

DEET: 30 to 50% DEET recommended for international travel. DEET based products are considered the gold standard of insect repellents under situations in which protection is crucial. Remarkable safety profile after >50 years of use. Rare reports of neurotoxicity primarily in children with chronic exposure to high concentrations or oral ingestion.	Picaridin: Has been used in Europe and Australia since 1998. Approved in the U.S. in 2005. No toxicity in humans has been reported.
Products stocked by CHS Healthy Heels Shoppe: Controlled release products with 30-34% DEET (Sawyer Ultra 30™ lotion & Ultrathon™ Lotion) Ben's 30 Wilderness™ Pump Spray (30% DEET)	Products stocked by CHS Healthy Heels Shoppe: 20% Picaridin (Sawyer Insect Repellent™ spray) May consider for international travel when DEET products are not tolerated.
Concentration and duration of protection: Controlled release products with 30-34% DEET protect for ~6 to 12 hours. These products also decrease absorption into skin. 30% DEET spray provides protection for ~4 to 6 hours. 50% DEET in a spray protects for ~6 to 8 hours. Over 50% appears to have little added benefit. Lower concentrations protect for shorter amounts of time: 20% gives ~4 hours of protection; 7% ~2 hours. (FYI: The original Skin-So-Soft 10 minutes!)	Concentration and duration of protection: 20% picaridin provides protection for ~8 hours. (9% protects for ~2 hours)
Notes: DEET can damage plastics, as well as certain synthetic fabrics such as rayon and spandex. Does not damage cotton, wool, or nylon.	Notes: Picaridin is odorless, non-sticky, and non-greasy. It does not irritate skin or damage plastics or fabrics.
Protection against ticks: yes, but needs to be reapplied more frequently. Duration of protection is shorter for ticks than for other insects.	Protection against ticks: 20% picaridin-yes. Recommended to reapply every 3 to 4 hours for tick protection. Lower concentrations, NOT effective against ticks.
Oil of Lemon Eucalyptus: plant based repellent. Protection similar to that provided by low concentrations of DEET (~2 hours). Not tested against mosquitoes that spread malaria and other diseases which occur internationally. Users criticize odor.	IR3535™ derived from a naturally occurring substance similar to the amino acid alanine. Variable results reported showing duration of protection from minutes to hours. Not enough data to trust for international travel.

Any repellent's effectiveness is reduced by rubbing off onto clothing; evaporating from or absorbing into the skin; washing off from swimming, sweating, or rain; and efficacy decreases dramatically with rising temperatures. So, **reapply if you start to be bitten.**

How much is needed? Estimated that ~1/3 ounce covers exposed skin of an adult wearing shorts and short-sleeved shirt. If you need serious insect protection, wear long sleeves and pants and a hat. Avoid skirts.

Permethrin is an insecticide registered by EPA for use on clothing, shoes, bed nets, camping gear, etc. Combining permethrin-treated clothing and DEET on exposed skin can give nearly 100% insect protection. CHS Healthy Heels Shoppe stocks a 0.5% spray. Spraying is best done outdoors. Spray each side of article just enough to moisten. Allow to dry completely before using. Reapply after 6 weeks or the sixth laundering. Buzz Off™ and Insect Shield™ are brands of clothing that has permethrin bound into the fabric.

Permethrin treated bed nets are recommended for accommodations without air-conditioning or adequate screening. Some nets are designed to hang from a hook in the ceiling over the bed. Others require taking your own cording to hang. Practice setting up your bed net before departure. If the net does not reach the floor, tuck the edges under the mattress. Avoid lying against the net to prevent being bitten through the net. Mesh size is important. Protection against mosquitoes requires about 400 holes/sq in. For sandflies, which are about one third the size of mosquitoes, >600 holes/sq in. is needed. Keep in mind though, the finer the mesh the less the air flow.

Other alternatives? Well...the ONLY place on earth to totally avoid the pesky mosquito is Antarctica!

Want to learn more: [CDC 2016 Yellow Book - Protection against Mosquitoes, Ticks, & Other Arthropods](#) and/or CDC [Avoid bug bites](#)

How to Use Repellents Safely:

- Read and follow all label directions and precautions.
 - Do not apply to cuts, wounds, or irritated skin.
 - Do not apply to hands of children (if child tends to put hands in mouth), or near eyes and mouth.
 - Do not allow young children to apply the product themselves.
 - The CDC recommends up to 50% DEET for adults and children ≥ 2 months old for protection in malaria risk areas. (American Academy of Pediatrics recommends up to 30% for infants ≥ 2 months of age and children.)
 - Oil of lemon eucalyptus labeling specifies that it should not be used on children <3 years old. This is due to inadequate testing in this age group.
 - Use just enough repellent to cover exposed skin.
 - Do not use repellents under clothing.
 - Do not use sunscreens that contain DEET, because sunscreen needs to be applied often and liberally and DEET is applied sparingly.
 - When using sunscreen and repellents together, apply the sunscreen first and then repellent.
 - Keep in mind that DEET can reduce a sunscreen's SPF by 33% when used together.
 - Avoid over-application of DEET products. Consider using a controlled release product, which has been shown to protect from 6-12 hours. Reapply if you start to be bitten.
 - After returning indoors, wash DEET-treated skin with soap and water. (Cutter says that picaridin does not need to be washed off after returning indoors.)
 - Use of DEET products may cause skin reactions in rare cases. Trying a different product or concentration might be helpful.
 - Recommendations for DEET (and picaridin) use in pregnant or lactating women are the same as for other adults according to the EPA. (Some DEET is absorbed within 2 hrs. after applying and eliminated from plasma within 4 hrs. after washing off skin.)
- For aerosol and pump sprays:
- Do not spray in enclosed areas.
 - To apply to face, spray on hands first and then rub on face.

References: 1) Fradin MS, Day JF. Comparative Efficacy of Insect Repellents against Mosquito Bites. NEJM 2002. 2) US EPA Reregistration of the Insect Repellent DEET <http://www.epa.gov/opp00001/citizens/deet.htm> (April 28, 1998). 3) Fradin MS. Mosquitoes and Mosquito Repellents: A Clinician's Guide. Ann Intern Med 1998. 4) Scheinfeld, N. Picaridin: a new insect repellent. J Drugs in Dermatology Jan-Feb 2004. 5) The Science Behind Picaridin. www.picaridin.com/science.htm 6) CDC Health Information for International Travel, 2012. 7) Petersen LR, Marfin AA. West Nile Virus: A Primer for the Clinician. Ann Intern Med 2002. 8) Frances SP, et al. Effectiveness of repellent formulations containing deet against mosquitoes in NE Thailand. J Am Mosq Control Assoc 1996. 9) www.uptodate.com accessed 9/4/2011. 10) Fradin MS. Insect Repellents. May 2009. emedicine.medscape.com/article/1088411. University of Southern California International Travel Medicine Review Course accessed June 2015.