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### **Recreational Activities and the Risk of Mosquito- Borne Diseases**

September means back-to-school activities, including the resumption of school-related outdoor sports, and while the weather is good, more barbecues and other outdoor recreational activities. However, September is also an active time for mosquito-borne diseases, including West Nile virus (WNV) and eastern equine encephalitis (EEE) virus infection. The peak time for transmission of these viruses is generally in late summer and early fall.

Many of the sports and recreational activities in which students are likely to participate occur during the evening and dusk hours, the time of the day when many kinds of mosquitoes are actively biting. Other mosquitoes feed during daylight hours. Active participation in outdoor sports increases our availability to mosquitoes. Physical exertion and sweating may also change individual attractiveness to mosquitoes and may decrease the time that repellents are effective.

Parents should review with their children the following steps to reduce the chance of infection:

**Avoid Outdoor Activity During Peak Mosquito Hours.** The hours from dusk to dawn are peak mosquito biting times for many mosquitoes. Take extra care to use repellent and protective clothing during evening and early morning -- or consider avoiding outdoor activities during these times.

**Clothing Can Help Reduce Mosquito Bites.** When possible, wear long-sleeves, long pants and socks when outdoors during peak mosquito activity time.

**Apply Mosquito Repellent when you go outdoors.** A wide variety of mosquito repellent products are available. The most effective repellents contain DEET (N, N-diethyl-m-toluamide), Picaridin (KBR 3023) or Permethrin. Always follow the instructions on the product label. DEET and Picaridin products can be used directly on skin and on clothing. Permethrin products can be used on clothing but not directly on skin. Oil of lemon eucalyptus has also demonstrated efficacy against mosquito bites, with protection similar to repellents with low concentrations of DEET. Products containing DEET should not be used on children less than 2 months of age. Products containing oil of lemon eucalyptus should not be used on children less than 3 years of age.

Apply only as much repellent as needed. Choose a product that will provide sufficient protection for the amount of time that you will be spending outdoors. Saturation does not increase repellent efficacy. Product labels often indicate the length of time that you can expect protection from a product. Keep repellents away from eyes, nostrils and lips: do not inhale or ingest repellents or get them into the eyes. Avoid applying repellents to portions of children's hands that are likely to have contact with eyes or mouth. Never use repellents on wounds or irritated skin. Wash repellent-treated skin after coming indoors.

This year, some areas of Massachusetts are considered to have a high risk for human infection with mosquito-borne disease. Contact your local board of health concerning the latest up-to-date information about the circulation of these viruses, the risk of transmission in your specific area, and the steps you may take to reduce risk of infection (including postponing certain activities).

More information on mosquito-borne diseases, on protecting yourself from bites by mosquitoes and on safe application of mosquito repellents can also be obtained by visiting the MDPH web site on arboviral (mosquito-transmitted) diseases <http://www.mass.gov/dph/wnv>.

# PUBLIC HEALTH FACT SHEET

## Mosquito Repellents

Massachusetts Department of Public Health (MDPH), 305 South Street, Jamaica Plain, MA 02130

### What is a mosquito repellent?

A mosquito repellent is a substance put on skin, clothing, or other surfaces which discourages mosquitoes from landing or crawling on that surface.

### Why should I use a mosquito repellent?

Mosquitoes can spread viruses that cause serious diseases. In Massachusetts, the diseases spread by mosquitoes are West Nile virus (WNV) and eastern equine encephalitis (EEE). Mosquito repellents can reduce your chances of being bitten by a mosquito and can reduce the risk that you will get one of these diseases.

### When should I use a mosquito repellent?

Use a mosquito repellent when you are outside and exposed to mosquitoes. Mosquitoes are generally most active between dusk and dawn, though some types may also be out during the day. Mosquitoes usually start to become active during early or mid-spring and remain active until the first hard frost (when the ground freezes).



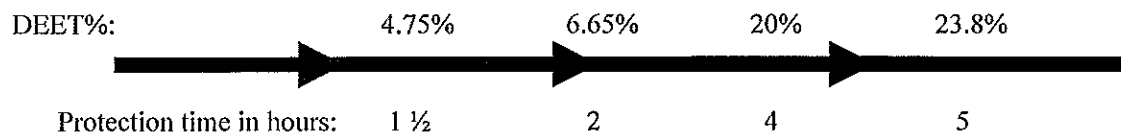
#### *Did you know?*

Every year from approximately late May until the first hard frost, mosquito samples are collected from various locations around the state and tested for WNV and EEE virus. Visit the MDPH website at [www.mass.gov/dph/wnv](http://www.mass.gov/dph/wnv) during the mosquito season to see where positive mosquito samples have been found.

### Which repellent should I use?

Different repellents work against different bugs. It is important to look at the active ingredient on the product label. Repellents that contain **DEET** (N, N-diethyl-m-toluamide), **permethrin**, **IR3535** (3-[N-butyl-N-acetyl]-aminopropionic acid) or **picaridin** (KBR 3023) provide protection against mosquitoes. In addition, **oil of lemon eucalyptus** [p-menthane 3, 8-diol (PMD)] has been found to provide as much protection as low concentrations of DEET when tested against mosquitoes found in the United States.

**DEET** products should not be used on infants under 2 months of age. Children older than two months should use products with DEET concentrations of 30% or less. DEET products are available in formulations up to 100% DEET, so always read the product label to determine the percentage of DEET included. Products with DEET concentrations higher than 30% do not confer much additional protection, but do last longer. In a study that looked at how long different concentrations of DEET worked against mosquitoes, the results ranged from 1½ to 5 hours. However, the length of protection time will vary widely depending on temperature, perspiration, and water exposure.



**Permethrin** products are intended for use on items such as clothing, shoes, bed nets and camping gear and should not be applied to skin. Apply the permethrin to your clothes before you put them on and follow the product's instructions.

**Oil of lemon eucalyptus** products should not be used on children under the age of three years.

### **Always Use Repellents Safely**

- ❖ Follow the instructions given on the product label. If you have questions after reading the label, such as how many hours does the product work for, or if and how often it should be reapplied, contact the manufacturer.
- ❖ Don't use repellents under clothing.
- ❖ Don't use repellents on cuts or irritated skin.
- ❖ Don't use repellents near the mouth or eyes and use them sparingly around the ears. When using spray products, spray the product onto your hands first, and then apply it to your face.
- ❖ Use just enough product to lightly cover exposed skin and/or clothing. Putting on a larger amount does not make the product work any better.
- ❖ Don't let children handle the product. When using repellents on children, put some on your hands first, and then apply it to the child. Don't put repellents on a child's hands.
- ❖ When you come inside, wash your skin and the clothes that had repellent on them.
- ❖ **If you develop a rash or other symptoms you think were caused by using a repellent**, stop using the product, wash the affected area with soap and water, and contact your doctor or local poison control center. If you go to the doctor, bring the product with you to show him or her.

### **Do "natural" repellents work?**

A number of plant-derived products are available for use as mosquito repellents, including oil of lemon eucalyptus and IR3535. Limited information is available regarding how well most of these products work and how safe they are. The information that is available shows that most of these products generally do not provide the same level or duration of protection as products like DEET or permethrin, except for oil of lemon eucalyptus and IR3535, which have been found to provide as much protection as low concentrations of DEET.

### **I'm concerned about using repellents on my infant. What else can I do to protect my infant from mosquitoes?**

Mosquitoes are most active between dusk and dawn, so try to avoid outdoor activities with your infant during these times. When your infant is outside, use mosquito netting on baby carriages or playpens and consider going indoors if you notice a lot of mosquito activity.

### **Where can I get more information?**

- The Massachusetts Department of Public Health (MDPH), Division of Epidemiology and Immunization at (617) 983-6800 or toll-free at (888) 658-2850, or on the MDPH Arbovirus website at [www.mass.gov/dph/wmv](http://www.mass.gov/dph/wmv), or your local board of health (listed in the telephone directory under local government).
- **Health effects of pesticides**, MDPH, Center for Environmental Health at 617-624-5757
- **Mosquito control in your city or town**: Mosquito control in Massachusetts is conducted through nine mosquito control districts. The State Reclamation and Mosquito Control Board (SRMCB) oversees all nine districts. Contact information for each district can be found online at [www.mass.gov/agr/mosquito/districts.htm](http://www.mass.gov/agr/mosquito/districts.htm). You may also contact the SRMCB within the Massachusetts Department of Agricultural Resources at 617-626-1777 or your local board of health.
- **Information on repellents** (such as choosing the right repellent, using repellents on children or pregnant women, or detailed toxicology information), National Pesticide Information Center (NPIC) toll free at 1-800-858-7378 or online at <http://npic.orst.edu/index.html>