

# PUBLIC HEALTH FACT SHEET

## Eastern Equine Encephalitis

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

### What is Eastern Equine Encephalitis?

Eastern equine encephalitis (EEE) is a rare but serious disease caused by a virus.

### How is the EEE virus spread?

The virus that causes EEE is spread through the bite of an infected mosquito. In Massachusetts, the virus is most often identified in mosquitoes found in and around freshwater, hardwood swamps. More information about different types of mosquitoes that can spread the virus can be found on the MDPH website at [www.mass.gov/dph](http://www.mass.gov/dph).

EEE virus particularly infects birds, often with no evidence of illness in the bird. Mosquitoes become infected when they bite infected birds. Although humans and several other types of mammals, particularly horses and llamas, can become infected, they do not spread disease.

### How common is EEE in Massachusetts?

EEE is a very rare disease. Since the virus was first identified in Massachusetts in 1938, fewer than 100 cases have occurred. Over 60% of those cases have been from Plymouth and Norfolk counties.

Outbreaks of EEE usually occur in Massachusetts every 10-20 years. These outbreaks will typically last two to three years. The most recent outbreak of EEE in Massachusetts began in 2004 and included 13 cases with six fatalities through 2006.

### What are the symptoms of EEE?

The first symptoms of EEE are fever (often 103° to 106°F), stiff neck, headache, and lack of energy. These symptoms show up three to ten days after a bite from an infected mosquito. Inflammation and swelling of the brain, called encephalitis, is the most dangerous and frequent serious complication. The disease gets worse quickly and some patients may go into coma within a week.

### What is the treatment for EEE?

There is no treatment for EEE. In Massachusetts, about half of the people identified with EEE died from the infection. People who survive this disease will often be permanently disabled. Few people recover completely.

### What can you do to protect yourself from EEE?

Since the virus that causes EEE is spread by mosquitoes, here are some things you can do to reduce your chances of being bitten:

- Schedule outdoor events to avoid the hours between dusk and dawn, when mosquitoes are most active.
- When you are outdoors, wear long pants, a long-sleeved shirt and socks. This may be difficult to do when the weather is hot, but it will help keep mosquitoes away from your skin.
- Use a repellent with **DEET** (N, N-diethyl-m-toluamide), **permethrin**, **picaridin** (KBR 3023), **IR3535** (3-[N-butyl-N-acetyl]-aminopropionic acid) or **oil of lemon eucalyptus** [p-menthane 3, 8-diol (PMD)] according to the instructions given on the product label. DEET products should not be used on infants under two months of age and should be used in concentrations of 30% or less on older children. Oil of lemon

eucalyptus should not be used on children under three years of age. Permethrin products are intended for use on items such as clothing, shoes, bed nets and camping gear and should not be applied to skin. More information on choosing and using repellents safely is included in the MDPH Fact Sheet on Mosquito Repellents which can be viewed online at [www.mass.gov/dph](http://www.mass.gov/dph). If you can't go online, contact the MDPH at (617) 983-6800 for a hard copy.

- Keep mosquitoes out of your house by repairing any holes in your screens and making sure they are tightly attached to all your doors and windows.
- Remove areas of standing water around your home. Here are some suggestions:
  - Look around outside your house for containers and other things that might collect water and turn them over, regularly empty them, or dispose of them.
  - Drill holes in the bottom of recycling containers that are left outdoors so that water can drain out.
  - Clean clogged roof gutters; remove leaves and debris that may prevent drainage of rainwater.
  - Turn over plastic wading pools and wheelbarrows when not in use.
  - Change the water in birdbaths every few days; aerate ornamental ponds or stock them with fish.
  - Keep swimming pools clean and properly chlorinated; remove standing water from pool covers.
  - Use landscaping to eliminate standing water that collects on your property.



#### *Did you know?*

Mosquitoes can begin to multiply in any puddle or standing water that lasts for more than four days! Mosquito breeding sites can be anywhere. **Take action** to reduce the number of mosquitoes around your home and neighborhood. Organize a neighborhood clean up day to pick up containers from vacant lots and parks and to encourage people to keep their yards free of standing water. Mosquitoes don't care about fences, so it's important to remove areas of standing water throughout the neighborhood.

### Need more information?

- **EEE and personal protection:** MDPH, Division of Epidemiology and Immunization at 617-983-6800 or online at [www.mass.gov/dph](http://www.mass.gov/dph). You may also contact your local board of health (listed in the telephone directory under "government").
- **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.
- **Health effects of pesticides:** MDPH, Center for Environmental Health at 617-624-5757

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

EEE-RELATED EDUCATIONAL MATERIALS FOR THE GENERAL PUBLIC

ITEM & FORMAT	LANGUAGES	HOW TO ACCESS
<b>HANDOUTS</b>		
EEE Fact Sheet (2 pages)	English, Spanish, Portuguese	Click on: English. <a href="http://www.mass.gov/Eeohhs2/docs/dph/cdc/factsheets/eee.pdf">http://www.mass.gov/Eeohhs2/docs/dph/cdc/factsheets/eee.pdf</a> Spanish. <a href="http://www.mass.gov/Eeohhs2/docs/dph/cdc/factsheets/eee_sp.pdf">http://www.mass.gov/Eeohhs2/docs/dph/cdc/factsheets/eee_sp.pdf</a> Portuguese. <a href="http://www.mass.gov/Eeohhs2/docs/dph/cdc/factsheets/eee_pt.pdf">http://www.mass.gov/Eeohhs2/docs/dph/cdc/factsheets/eee_pt.pdf</a>
Mosquito Repellents Fact Sheet (2 pages)	English, Spanish, Portuguese	Click on: English. <a href="http://www.mass.gov/Eeohhs2/docs/dph/cdc/factsheets/mosquito_repellents.pdf">http://www.mass.gov/Eeohhs2/docs/dph/cdc/factsheets/mosquito_repellents.pdf</a> Spanish. <a href="http://www.mass.gov/Eeohhs2/docs/dph/cdc/factsheets/mosquito_repellents_sp.pdf">http://www.mass.gov/Eeohhs2/docs/dph/cdc/factsheets/mosquito_repellents_sp.pdf</a> Portuguese. <a href="http://www.mass.gov/Eeohhs2/docs/dph/cdc/factsheets/mosquito_repellents_pt.pdf">http://www.mass.gov/Eeohhs2/docs/dph/cdc/factsheets/mosquito_repellents_pt.pdf</a>
Frequently Asked Questions About Aerial Spraying to Reduce Risk of EEE (5 pages)	English, Spanish, Portuguese	Click on: English. <a href="http://www.mass.gov/?pageID=eohhs2terminal&amp;L=6&amp;L0=Home&amp;L1=Consumer&amp;L2=Community+Health+and+Safety&amp;L3=Environmental+Health&amp;L4=Environmental+Exposure+Topics&amp;L5=Pesticide+Spray&amp;sid=Eeohhs2&amp;b=terminalcontent&amp;f=dph_environmental_c_mosquito_anvil_application_faqs&amp;csid=Eeohhs2">http://www.mass.gov/?pageID=eohhs2terminal&amp;L=6&amp;L0=Home&amp;L1=Consumer&amp;L2=Community+Health+and+Safety&amp;L3=Environmental+Health&amp;L4=Environmental+Exposure+Topics&amp;L5=Pesticide+Spray&amp;sid=Eeohhs2&amp;b=terminalcontent&amp;f=dph_environmental_c_mosquito_anvil_application_faqs&amp;csid=Eeohhs2</a> Spanish. <a href="http://www.mass.gov/Eeohhs2/docs/dph/environmental/exposure/spray_faq_eee_spanish.pdf">http://www.mass.gov/Eeohhs2/docs/dph/environmental/exposure/spray_faq_eee_spanish.pdf</a> Portuguese. <a href="http://www.mass.gov/Eeohhs2/docs/dph/environmental/exposure/spray_faq_eee_portuguese.pdf">http://www.mass.gov/Eeohhs2/docs/dph/environmental/exposure/spray_faq_eee_portuguese.pdf</a>

Frequently Asked Questions About Mosquitoes in Massachusetts Fact Sheet (2 pages)	English	Click on: <a href="http://www.mass.gov/Eeohhs2/docs/dph/cdc/arbovirus/faq_mosquitoes_ma.pdf">http://www.mass.gov/Eeohhs2/docs/dph/cdc/arbovirus/faq_mosquitoes_ma.pdf</a>
Common Mosquitoes That Can Spread Disease in Massachusetts (1 page)	English	Click on: <a href="http://www.mass.gov/Eeohhs2/docs/dph/cdc/arbovirus/mosquito_species_ma.pdf">http://www.mass.gov/Eeohhs2/docs/dph/cdc/arbovirus/mosquito_species_ma.pdf</a>
Preventing Disease Spread by Mosquitoes in MA Booklet (8 pages)	English	Click on: <a href="http://www.mass.gov/Eeohhs2/docs/dph/cdc/arbovirus/mosquito_preventing.pdf">http://www.mass.gov/Eeohhs2/docs/dph/cdc/arbovirus/mosquito_preventing.pdf</a> <b>NOTE:</b> Items is also available in hard copy to order. Use Order Form (last page of this document) with Item #000346.
Mosquito Quiz (1 page)	English	Click on: <a href="http://www.mass.gov/Eeohhs2/docs/dph/cdc/arbovirus/mosquito_quiz.rtf">http://www.mass.gov/Eeohhs2/docs/dph/cdc/arbovirus/mosquito_quiz.rtf</a>
<b>POSTERS</b>		
Bug Spray Helps Keep Mosquitoes Away, #1	English	Click on: <a href="http://www.mass.gov/Eeohhs2/docs/dph/cdc/arbovirus/mosquito_poster_one.pdf">http://www.mass.gov/Eeohhs2/docs/dph/cdc/arbovirus/mosquito_poster_one.pdf</a>
Bug Spray Helps Keep Mosquitoes Away, #2	English	Click on: <a href="http://www.mass.gov/Eeohhs2/docs/dph/cdc/arbovirus/mosquito_poster_two.pdf">http://www.mass.gov/Eeohhs2/docs/dph/cdc/arbovirus/mosquito_poster_two.pdf</a> <b>NOTE:</b> Item is also available in hard copy to order. Use Order Form (last page of this document) with Item #000912
Bug Spray Helps Keep Mosquitoes Away, #3	English	Click on: <a href="http://www.mass.gov/Eeohhs2/docs/dph/cdc/arbovirus/use_bug_spray_poster.pdf">http://www.mass.gov/Eeohhs2/docs/dph/cdc/arbovirus/use_bug_spray_poster.pdf</a>

August 2, 2010

Massachusetts Department of Public Health  
Bureau of Infectious Disease  
Educational Materials Order Form

*NOTE: Only 2 of the EEE items listed on the chart above are available for hard copy order.*

Item #	Title	Languages	Quantity

Quantities may be limited; please order only what you actually need. Thank you.

Ship materials to:

<b>Name</b>	
<b>Organization</b>	
<b>Street Address</b>	
<b>City, State, Zip</b>	
<b>Telephone</b>	
<b>Email</b>	

**Fax this form to the MDPH Bureau of Infectious Disease (BID) Distribution Center at 978-640-9671.**

Please call 978-640-9673 if you have questions about these materials.

## **Q and A Reference Resource Regarding EEE**

### **Q: What is Eastern Equine Encephalitis?**

A: Eastern equine encephalitis (EEE) is a rare but serious disease caused by a virus.

### **Q: How is the EEE virus spread?**

A: The virus that causes EEE is spread through the bite of an infected mosquito. The virus is most often identified in mosquitoes found in and around the freshwater, hardwood swamps that are common in southeastern Massachusetts.

EEE virus particularly infects birds, often with no evidence of illness in the bird. Mosquitoes become infected when they bite infected birds. Some mosquitoes will bite birds, become infected and then bite humans, spreading the disease to them. Although humans and several other types of mammals, particularly horses and llamas, can become infected, they do not spread disease.

### **Q: What are the symptoms of EEE?**

A: The first symptoms of EEE are fever (often 103° to 106°F), stiff neck, headache, and lack of energy. These symptoms show up three to ten days after a bite from an infected mosquito. Inflammation and swelling of the brain, called encephalitis, is the most dangerous and frequent serious complication. The disease gets worse quickly and some patients may go into coma within a week.

### **Q: How is EEE treated?**

A: There is no specific treatment for EEE which is why it is so important to avoid becoming infected.

### **Q: How often does EEE occur in Massachusetts?**

A: Outbreaks of EEE usually occur in Massachusetts every 10-20 years. These outbreaks will typically last two to three years. The most recent outbreak of EEE in Massachusetts began in 2004 and included 13 cases with six fatalities through 2006. Isolated cases can occur at any time, there was one person infected with EEE in 2008.

### **Q: Why are we worried about EEE this year?**

A: The Massachusetts Department of Public Health and the 9 Mosquito Control Projects set traps for and collect mosquitoes for testing during the summer and fall. This year, mosquitoes infected with EEE were found in mid-July, much earlier than usual. Since that time, there have been more collections of mosquitoes infected with EEE than have ever been seen in July before.

Recently, a significant number of these infected mosquitoes have been species that usually bite mammals, including humans, rather than species that usually bite birds. This indicates that the chance for human infection with EEE is increasing.

**Q: What kind of mosquito control is usually done in my town?**

A: Routine measures to protect people from EEE are conducted by the Mosquito Control Projects. Their work is aimed at reducing breeding sites, larviciding to eliminate mosquitoes before they become adults, spraying pesticides from trucks to reduce adult mosquitoes and public education. Truck-based spraying to kill adult mosquitoes can be very effective in areas where there are lots of streets and houses. In more rural areas, the spray doesn't move very far from the road and only mosquitoes near the road will be killed.

**Q: Why is aerial spraying of pesticides being considered now?**

A: Despite the routine mosquito control activities, the number of EEE infected mosquitoes is increasing and there is a substantial risk for human infection. Aerial spraying of pesticide provides more extensive mosquito control and extends into areas, like swamps, where control from truck-based spraying is not possible. Reducing the number of adult mosquitoes over the entire area of risk should also reduce the chances that people will get sick from EEE.

**Q: How will I know when aerial spraying is going to occur?**

A: Announcements about when and where aerial spraying will occur will be made through media outlets and will be available on the Department of Public Health's website.

**Q: Should I be concerned about covering the swimming pool in my yard?**

A: All types of pesticides used in spraying operations for adult mosquito control break down quickly in sunlight and water. Therefore, no special precautions or waiting periods are recommended for outdoor swimming pools. However, if a pool is not being used during the summer months (e.g., if it not being chlorinated or filtered), it should be covered or drained. Any standing body of water is a potential breeding ground for mosquitoes.

**Q: Can I request that my property be excluded from an aerial spray?**

A: While it is possible to request that your property be excluded from truck-based spraying activities, it will not be possible to be excluded from an aerial spray activity. In part this is because of the way the spray will drift as it is applied by the airplane so that it is not possible to avoid application to small areas. However, the primary reason that exclusions are not possible is that aerial spraying for mosquito control is only done when the risk for human disease cannot be controlled in any other way. Multiple exclusion areas would substantially reduce the effectiveness of the pesticide and would limit the reduction of risk.

**Q: What else can I do to reduce my chances of becoming infected with EEE?**

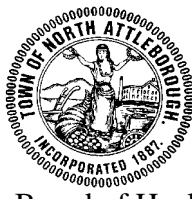
A: Since the virus that causes EEE is spread by mosquitoes, here are some things you can do to reduce your chances of being bitten:

- Schedule outdoor events to avoid the hours around dusk and dawn, when mosquitoes are most active.

- When you are outdoors, wear long pants, a long-sleeved shirt and socks. This may be difficult to do when the weather is hot, but it will help keep mosquitoes away from your skin.
- Use a repellent with **DEET permethrin, picaridin, or oil of lemon** according to the instructions given on the product label. More information on choosing and using repellents safely is included in the MDPH Fact Sheet on Mosquito Repellents which can be viewed online at [www.mass.gov/dph](http://www.mass.gov/dph). If you can't go online, contact the MDPH at (617) 983-6800 for a hard copy.
- Keep mosquitoes out of your house by repairing any holes in your screens and making sure they are tightly attached to all your doors and windows.
- Remove areas of standing water around your home.

**Q: Where can I get more information?**

- **EEE and personal protection:** MDPH, Division of Epidemiology and Immunization at 617-983-6800 or online at [www.mass.gov/dph](http://www.mass.gov/dph). You may also contact your local board of health (listed in the telephone directory under "government").
- **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.
- **General information on pesticides:** U.S. Environmental Protection Agency, [www.epa.gov/pesticides/factsheets](http://www.epa.gov/pesticides/factsheets) or the National Pesticides Telecommunications Network (NTPN), <http://ace.orst.edu/info/nptn/wnv/>
- **Health effects of pesticides:** MDPH, Center for Environmental Health at 617-624-5757



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Anne Marie Fleming, RN*

**FOR IMMEDIATE RELEASE:**

August 4, 2010

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**CONTACT:**

Robert Davis, Health Director or  
AnneMarie Fleming, Public Health Nurse

**Eastern Equine Encephalitis (EEE) Information for North Attleboro**

**North Attleboro, MA** - The Massachusetts Department of Public Health (MDPH) has announced that the risk for eastern equine encephalitis (EEE) in people has increased in a large part of southeastern Massachusetts. Although Lakeville and Middleborough had already been considered to be at high risk for human disease due to several mosquito samples testing positive for EEE and the death of a horse from EEE in Middleborough, MDPH has expanded the EEE high risk area to include Acushnet, Berkley, Bridgewater, Carver, Duxbury, Fairhaven, Freetown, Halifax, Kingston, Mattapoisett, New Bedford, Plympton, Raynham, Rochester and Taunton. The towns immediately surrounding that area are at moderate risk, and the towns even further away have been deemed to be at low risk. Until testing indicates otherwise, North Attleboro remains one of the communities in Southeastern Massachusetts deemed to be at low risk for EEE. Aerial spraying is occurring in those high risk communities.

EEE is a rare but serious illness spread by the bite of an infected mosquito. While EEE can infect people of all ages, people under 15 years of age or over 50 years of age are at greatest risk for serious illness.

**By taking a few common-sense precautions, people can help to protect themselves and their loved ones:**

**Avoid Mosquito Bites!**

- **Be Aware of Peak Mosquito Hours** - The hours from dusk to dawn are peak biting times for mosquitoes. Consider rescheduling outdoor activities that occur during the evening or early morning. Take extra care to use repellent and protective clothing.
- **Clothing Can Help** reduce mosquito bites. Although it may be difficult to do when it's hot, wearing long-sleeves, long pants and socks when outdoors will help keep mosquitoes away from your skin.
- **Apply Insect Repellent** when you go outdoors. Use a repellent with **DEET** (N, N-diethyl-m-toluamide), **permethrin**, **picaridin** (KBR 3023), **IR3535** or **oil of lemon eucalyptus** [p-methane 3, 8-diol (PMD)] according to the instructions on the product label. DEET products should not be used on infants under two months of age and should be used in concentrations of 30% or less on older children. Oil of lemon eucalyptus should not be used on children under three years of age. Permethrin products are intended for use on items such as clothing, shoes, bed nets and camping gear and should not be applied to skin.

### **Mosquito-Proof Your Home!**

- **Drain Standing Water** - Mosquitoes lay their eggs in standing water. Limit the number of places around your home for mosquitoes to breed by either draining or getting rid of items that hold water. Check rain gutters and drains. Empty any unused flowerpots and wading pools, and change water in birdbaths frequently.
- **Install or Repair Screens** - Some mosquitoes like to come indoors. Keep them outside by having tightly-fitting screens on all of your windows and doors.

All area residents are encouraged to take the precautions listed above throughout the day and evening. North Attleboro and its Health Department continue to work closely with the MDPH and other agencies, particularly the Bristol County Mosquito Control Program, to stay informed about mosquito control activities, disease risk and health status in Southeastern Massachusetts.

Information about EEE and reports of EEE virus activity in Massachusetts during 2010 can be found on the MDPH website at [www.mass.gov/dph](http://www.mass.gov/dph) under A for arbovirus in the Health Topics A to Z index. Recorded information about EEE is available by calling the MDPH Public Health Information Line at 1-866-MASS-WNV (1-866-627-7968) and fact sheets on EEE are available in the North Attleboro Health Department office for residents without computer access.

# 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).



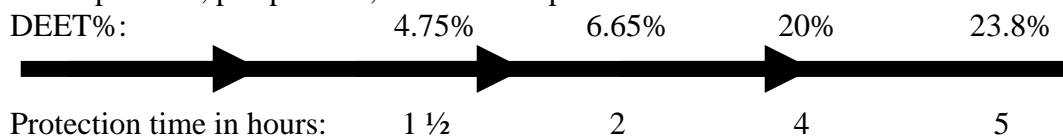
#### *Did you know?*

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/cdc/wnv/wnv1.htm](http://www.mass.gov/dph/cdc/wnv/wnv1.htm) 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?**

- **For more information on repellents (such as choosing the right repellent, using repellents on children or pregnant women, or detailed toxicology information)**, contact the National Pesticide Information Center (NPIC) toll free at 1-800-858-7378 or online at [npic.orst.edu/wnv/pesticideinfo.htm#repellents](http://npic.orst.edu/wnv/pesticideinfo.htm#repellents).
- **For questions on health effects of pesticides**, contact the MDPH, Center for Environmental Health at 617-624-5757.
- **For questions on diseases spread by mosquitoes**, contact the MDPH, Division of Epidemiology and Immunization at 617-983-6800 or online at [www.mass.gov/dph](http://www.mass.gov/dph).