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MEMORANDUM

DATE: August 15, 2016

TO: Ms. Kimberly Xavier, DMMA  
Planning & Policy Development Unit

FROM: Ms. Jamie Wolfe, Chairperson  
State Council for Persons with Disabilities

RE: 20 DE Reg. 83 & 91 [(DMMA Emergency & Proposed Medicaid Nonprescription Drug Regulation (8/1/16)]

The State Council for Persons with Disabilities (SCPD) has reviewed the Department of Health and Social Services/Division of Medicaid and Medical Assistance's (DMMA's) emergency and proposed regulations to authorize coverage of mosquito repellent to protect Medicaid beneficiaries against the Zika virus. The emergency regulation was published as 20 DE Reg. 83 in the August 1, 2016 issues of the Register of Regulations and the proposed regulation was published as 20 DE Reg. 91 in the August 1, 2016 issue of the Register of Regulations. The initiative is prompted by the attached June 1, 2016 CMCS Informational Bulletin. SCPD has the following observations.

First, consistent with the Bulletin (p. 2), CMS recommends coverage of EPA-registered repellents containing "one of the following active ingredients: DEET, picaridin, IR3535, oil of lemon eucalyptus, or para-menthane-diol". One concern is whether some of these repellents could affect fetuses. The attached New York Times article notes that there are few studies of the effect of DEET on fetuses although the mainstream view is that DEET is not overtly harmful. At the same time, the article notes that DEET is less protective of women than men. It also suggests a preference for some restraint in usage:

Pregnant women who wish to be extremely cautious may use a repellent with a lower concentration of DEET to limit how much gets into their blood, said Dr. Sarah G. Obican, a maternal fetal specialist and a member of the Organization of Teratology Information Specialists. "Using a 6 percent DEET product will last you two hours, and 20 percent one will last close to four hours," Dr. Obican said. "Why not use the lower concentration and apply more often?"

The article also notes that "IR3535" is a "biopesticide", not simply a repellent.

The attached Consumer Reports article provides an overview of the effectiveness of mosquito repellents and rates relatively benign oil of lemon eucalyptus as effective.

The bottom line is that DMMA, in consultation with DPH, may wish to encourage judicious use of covered repellents. Indeed, DMMA may wish to only cover DEET at concentrations of 50% or less. See attached CDC Fact Sheet, noting that "concentrations over 50% provide no added protection". The Fact Sheet also includes admonitions to "avoid over-application of the product" and "Do not breathe in, swallow, or get into the eyes (DEET is toxic if swallowed.)".

Second, DMMA is deleting a paragraph explicitly including certain nonprescription drugs, including contraceptives, lice control preparations, and topical antibacterials and fungicides. At 87 and 95). This deletion is not problematic IF these agents are included in the DMMA Pharmacy Provider Manual Appendix A - Covered Over-the-Counter Drugs cited on pp. 86 and 94. Otherwise, DMMA could be inadvertently deleting coverage of the drugs listed in this paragraph.

Third, DMMA is deleting a section authorizing coverage of several products, including "Dialysis replacement products". At pp. 86-87 and 94. DMMA may wish to confirm that such products are included in the DMMA Pharmacy Provider Manual Appendix A - Covered Over-the-Counter Drugs cited on pp. 86 and 94. Otherwise, DMMA could be inadvertently deleting coverage of the products listed in this section, including "Dialysis replacement products".

Fourth, the same section being deleted explicitly clarifies that agents for the symptomatic relief of coughs and colds include "antihistamines, antitussives, decongestants, and expectorants". At pp. 86 and 94. DMMA may wish to confirm that this range of products is included in the DMMA Pharmacy Provider Manual Appendix A - Covered Over-the-Counter Drugs cited on pp. 86 and 94. Otherwise, DMMA could be inadvertently deleting coverage of some cough and cold relief products listed in this section.

SCPD endorses coverage of insect repellents subject to consideration of the above observations.

Thank you for your consideration and please contact SCPD if you have any questions or comments regarding our position or observations on the proposed regulation.

cc: Mr. Stephen Groff  
Ms. Karyl Rattay  
Mr. Brian Hartman, Esq.  
Governor's Advisory Council for Exceptional Citizens  
Developmental Disabilities Council

20reg83-91 dmma-medicaid nonprescription drug 8-8-16

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*CMCS Informational Bulletin*

**DATE:** June 01, 2016

**FROM:** Vikki Wachino, Director  
Center for Medicaid and CHIP Services (CMCS)

**SUBJECT:** **Medicaid Benefits Available for the Prevention, Detection and Response to the Zika Virus**

The purpose of this CMCS Informational Bulletin is to inform Medicaid agencies and interested stakeholders about how Medicaid services and authorities can help states and territories prevent, detect, and respond to the Zika virus, including efforts to prevent the transmission and address health risks to beneficiaries from the Zika virus. We encourage states to use the flexibilities outlined below.

**Zika Virus Background**

Outbreaks of Zika have been reported in Africa, the South Pacific and most recently in the Americas. The Zika virus is spread to people primarily through the bite of an infected *Aedes* (*Ae. aegypti* and *Ae. albopictus*) species mosquito. The Zika virus can also be sexually transmitted from a man to his partner(s) regardless of gender. The Centers for Disease Control and Prevention (CDC) urges that men at risk of or with recent Zika virus infection use condoms or abstain from sex to prevent transmission.

The most common symptoms of Zika infection are fever, rash, joint pain, and conjunctivitis (red eyes). In past outbreaks, the illness has usually been mild with symptoms lasting for several days to a week after being bitten by an infected mosquito. People usually don't get sick enough to go to the hospital and they very rarely die of Zika infection. For this reason, many people might not realize they have been infected.

Zika virus infection during pregnancy can lead to serious health consequences. The CDC has stated that Zika virus can be passed from a pregnant woman to her fetus, and infection during pregnancy has been linked to a serious birth defect of the brain called microcephaly, which involves incomplete brain development, and other severe brain defects. Other problems have been detected in fetuses and infants infected with Zika virus, such as defects of the eye, hearing deficits, and impaired growth. A mother infected with the Zika virus near the time of delivery can pass on the virus to her newborn around the time of birth.

Zika has also been linked to Guillain-Barré syndrome (GBS), a rare disorder that can cause muscle weakness and paralysis for a few weeks to several months. Most people fully recover from GBS, but some have permanent damage.

The CDC is continuing to review medical information related to the Zika virus, and recently issued new guidance and information to prevent Zika virus transmission and its adverse health effects. Guidance includes updated interim guidance for healthcare professionals for counseling patients about pregnancy planning and the timing of pregnancy after possible exposure to Zika virus and updated interim guidance for preventing sexual transmission with information about how long men and women should consider using condoms or not having sex after possible exposure to Zika. We recommend monitoring the CDC website ([www.cdc.gov/zika/index.html](http://www.cdc.gov/zika/index.html)) for updated information and guidance on the Zika virus.

### **Key Services and Benefits in the Prevention, Diagnosis, and Treatment of Zika Virus and Related Health Conditions**

This section highlights services that will be particularly important to address Zika virus and associated health conditions. In each instance, we have identified authorities and flexibilities states and territories have to provide these critical services to beneficiaries in their programs.

#### **Prevention**

There is no vaccine available for Zika virus. The major means of prevention currently available are mosquito control, protection against mosquito bites, and contraception for women of childbearing age who do not wish to become pregnant.

##### *Repellents*

Mosquito repellents that are applied to the skin can aid in preventing infection with the Zika virus. CDC recommends people use Environmental Protection Agency (EPA)-registered insect repellents with one of the following active ingredients: DEET, picaridin, IR3535, oil of lemon eucalyptus, or para-menthane-diol. EPA-registered repellents have been evaluated by the EPA for effectiveness. As a general matter, over the counter insect repellents would not be covered by Medicaid. However, state Medicaid programs may choose to cover mosquito repellents when prescribed by an authorized health professional and these products would be eligible for Federal Financial Participation (FFP) under such circumstances.

##### *Family Planning and Services for Men and Women Who Are of Child Bearing Age or Women Who Are Pregnant*

The Zika virus has serious effects for pregnant women, fetuses and children, making the family planning services and supplies available through Medicaid critical. Counseling to help beneficiaries make informed and responsible decisions about family planning, reproductive health and contraception is a critical tool to prevent the spread of Zika virus and health conditions associated with Zika virus, such as microcephaly.

- *Family planning counseling.* States may offer family planning counseling to help beneficiaries make informed and responsible decisions about family planning and reproductive health, as well as learn safe sexual practices to reduce Zika transmission.
- *Contraception.* The family planning services and supplies benefit covers services that may prevent the transmission of the Zika virus by providing access to barrier method

contraceptives such as condoms and other methods of contraception that prevent or delay pregnancy. States may also cover items such as oral contraceptives, condoms, diaphragms, foams, gels, patches, rings, injections, tablets, emergency contraceptives, and long-acting reversible contraception (LARC). LARC includes both intrauterine devices (IUDs) and contraceptive implants. Reimbursement for LARC should be reasonable and include the device itself as well as its insertion and removal. For best-practices in LARC payment approaches, please see the CMCS Informational Bulletin titled “State Medicaid Payment Approaches to Improve Access to Long-Acting Reversible Contraception” issued on April 8, 2016 which can be accessed at <https://www.medicaid.gov/federal-policy-guidance/downloads/CIB040816.pdf>.

Services provided under the family planning benefit are eligible for enhanced FFP at 90 percent.

### **Detecting Zika Infection and Associated Health Risks**

The Medicaid program offers a wide array of services that states can cover to assist with diagnosing the Zika virus.

Diagnostic services are instrumental in detecting a Zika virus infection as well as associated health risks, such as microcephaly. They include services such as CAT scans, MRIs, ultrasounds, blood tests, urine tests, and genetic testing. For example, if a pregnant women has recently traveled to an area with active mosquito-borne transmission of the Zika virus, her primary care doctor may recommend a blood test. If positive, her doctor may order an ultrasound to assess the health and development of the fetus. If abnormalities are detected, further testing may be required, including CAT scans and MRIs to ensure the health of the mother and fetus.

States can make these services available to adults through the optional diagnostic services<sup>1</sup> benefit, screening services<sup>2</sup> benefit, other preventive services benefit, and other laboratory and x-ray services benefit.

States are required to cover all medically necessary diagnostic services related to the detection of a Zika virus infection, including diagnosis of microcephaly and other birth defects without limit to individuals under the age of 21 through the Early Periodic Screening, Diagnostic, and Treatment (EPSDT) benefit.

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<sup>1</sup> The optional diagnostic services benefit provides coverage for any medical procedures or supplies recommended by a physician or other licensed practitioner of the healing arts. This benefit enables the provider to identify the existence, nature or extent of the Zika virus, including any injury or other health conditions associated with the virus.

<sup>2</sup> The optional screening services benefit provides for standardized testing under medical direction for screening of a population to detect the existence of illness, injury or other health deviations including the Zika virus.

## **Treatment**

Treatment of individuals with the Zika virus or those with conditions that may be a result of the Zika virus is supported by services available through the Medicaid program.

A comprehensive range of services for beneficiaries under the age of 21, including services related to the treatment of the Zika virus and microcephaly or other Zika-related disabilities, is covered without limit under the mandatory EPSDT benefit. The EPSDT benefit provides coverage of all medically necessary treatment services described in section 1905(a) of the Social Security Act for beneficiaries under the age of 21, even if the services are not covered for adults.

### ***Targeted Case Management Services***

Targeted case management (TCM) is an optional benefit that can be used by states to assist Medicaid beneficiaries in gaining access to needed medical, social, educational and other services. TCM includes assessment, development of a care plan, referral and monitoring. Children with Zika related disabilities are likely to require supportive care, symptom management, as well as treatment for intellectual, developmental, and speech and hearing disabilities. TCM can assist by connecting children to needed medical care and other services in a coordinated manner.

### ***Physical Therapy and Related Services***

People with Zika related disabilities, including those recovering from GBS, likely would need physical therapy and related services. States have the option to provide speech, physical, occupational, and audio logic therapy to beneficiaries.

### ***Prescribed Drugs***

All states cover prescribed drugs under their Medicaid programs. States should ensure that this coverage is sufficient for the management of symptoms related to Zika infections. Specifically, individuals with Zika may be prescribed antipyretic analgesics, like acetaminophen, to relieve fever and pain, as well as electrolyte solutions to prevent dehydration.

### ***Long-Term Services and Supports***

Children born with microcephaly or other serious Zika-related disabilities or individuals who require long-term rehabilitative care while recovering from GBS may require nursing home services or home and community-based long-term services and supports. Medicaid offers many options for coverage of these services, which can also be used to support children living at home. States have significant flexibility in designing these services.

## **Additional Benefit Options and Relevant Authorities**

*Additional services provided by managed care plans.* At their discretion, managed care plans may choose to provide products and/or services beyond what is included in the benefit package under their contracts, provided that such additional services are not included in the capitation rates. Such additional services could include mosquito repellents (described above) that are not included in the contract benefit package, or non-medical measures to deter mosquitoes, such as

inspections to determine likely mosquito breeding locations, aerosol insecticides (dispensed to the air or environmental surfaces), protective clothing, window screens, and other environmental modifications to combat the spread of the Zika virus. Although the managed care plan may determine that there is value in providing such products or services, as they may prevent more costly future health care needs, per current 42 CFR 438.6(e)<sup>3</sup>, the state may not consider those costs when developing the capitation rates, nor may the state mandate the provision of these additional services to enrollees.

*Extended Medicaid Services for Pregnant Women.* States may provide extended Medicaid pregnancy-related services for pregnant women that are greater in amount, duration and scope than is provided to other individuals in the state plan. The extended services must be equal in amount, duration, and scope for all pregnant women in the state plan. For example, a state may have a limitation of one ultrasound for non-pregnant women in the state plan. However, because of health concerns associated with the Zika virus, the state could determine that all pregnant women may receive more than one ultrasound when medically appropriate or necessary. The CDC recommends serial ultrasounds should be considered to monitor fetal anatomy and growth every 3-4 weeks as well as referral to a maternal-fetal medicine or infectious disease specialist with expertise in pregnancy management.

*Waivers and Demonstrations.* There may be additional opportunities to cover products and/or services related to the prevention, detection, and treatment of Zika through a section 1115 demonstration or through a section 1915(b)(3) waiver. Each demonstration or waiver proposal is unique and state-specific; CMS would be interested in potential approaches that serve the needs of particular states.

CMS is available to provide technical assistance to states and the territories using existing Medicaid authorities to address the serious health challenges posed by the Zika virus. For additional information about this Informational Bulletin, please contact Kirsten Jensen, Director Division of Benefits and Coverage at 410-786-8146.

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<sup>3</sup> Effective July 5, 2016, this requirement will be found at 42 CFR 438.3(e).

HEALTH

# DEET Seen as Safe for Pregnant Women to Avoid Zika Despite Few Studies

By CATHERINE SAINT LOUIS APRIL 4, 2016

This summer, some yellow-fever mosquitoes carrying the Zika virus are expected to arrive along the Gulf Coast and elsewhere in the continental United States. Health officials are urging people to use insect repellents with DEET to avoid being bitten.

The mounting evidence that the virus is strongly linked with birth defects makes this a priority for pregnant women. But is it safe to use repellents containing DEET with a baby on the way?

Although the scientific evidence is a bit thinner than some experts would like, most say the answer is yes, as long as you do not overapply.

Few published studies address the effects of DEET, short for N,N-diethyl-metoluamide, in mothers-to-be and their offspring. None involved pregnant women in the first trimester, the period when most birth defects occur.

Still, the existing evidence in pregnant women is reassuring. Even though there is not “a lot of” research, “it makes sense to use DEET to protect yourself from something we know is truly unsafe, like Zika,” said Dr. Laura E. Riley, a specialist who works with high-risk pregnancies and infectious disease at Massachusetts General Hospital.

A randomized trial of roughly 900 women in Thailand, published in 2001, provides some of the strongest evidence that using DEET daily for months will probably not hurt a fetus.

A malaria infection in pregnancy can lead to miscarriage or stillbirth. To prevent it, half of the women in the study applied a 20 percent concentration of DEET mixed with a makeup called thanaka daily in their second and third trimesters. The other half wore only thanaka.

DEET can cross the placenta and reach the fetus, the researchers found. But DEET was detected in the blood of the umbilical cord in just four of 50 users.

Importantly, “the newborns weren’t affected in terms of growth or development from DEET exposure,” said Dr. Rose McGready, the study’s lead author and a professor of tropical maternal and child health at the University of Oxford. No adverse effects on growth were found among the children a year later, either.

But the study “didn’t include the first trimester,” Dr. McGready said. “That’s an important missing component.”

Asked about the paucity of published studies looking at DEET use in the first trimester, Jack Housenger, the director of the Environmental Protection Agency’s office of pesticides programs, replied in a statement, “DEET is safe, including for pregnant women at any stage.”

In 2014, a safety review by the E.P.A. did not identify “any risks of concern to human health” if the directions are followed. The agency’s review assessed the potential risks of long- and short term use of DEET in pregnant animals.

The Centers for Disease Control and Prevention counsels pregnant women to use any E.P.A.-registered repellent, including those with picaridin (a synthetic compound), IR3535 (a biopesticide) and DEET. In animal studies, the E.P.A. has found no evidence that either picaridin or IR3535 is harmful to the developing fetus.

DEET was registered with the E.P.A. for public use in 1957, picaridin in 2005 and IR3535 in 1999, but the last two were used abroad for years before.

Bob Peterson, a professor of entomology at Montana State University, published a risk assessment of DEET and picaridin in 2008. Exposures are acceptable in adults and children if they are used “according to instructions on the package,” he said.

An estimated 104 million Americans use DEET every year, and reports of adverse events are “relatively small by comparison,” the E.P.A. wrote in its safety review.

Only minimal amounts of DEET cross into a pregnant mother’s bloodstream, suggesting babies are exposed to very little.

In 2010, researchers, including some from the C.D.C., analyzed the blood of 150 pregnant women in New Jersey and their umbilical cords for a range of pesticides.

“DEET was not at remarkable levels,” said Mark Robson, the study’s senior author and a professor of plant biology and pathology at Rutgers University. “Birth weight, length and circumference were all normal” for all infants.

Pregnant women who wish to be extremely cautious may use a repellent with a lower concentration of DEET to limit how much gets in their blood, said Dr. Sarah G. Obican, a maternal fetal specialist and a member of the Organization of Teratology Information Specialists.

“Using a 6 percent DEET product will last you two hours, and 20 percent one will last close to four hours,” Dr. Obican said. “Why not use the lower concentration and apply more often?”

A 1999 trial with 60 men and 60 women who used a 31 percent concentration of DEET found women had significantly less protection over time than men did from *Anopheles stephensi* mosquitoes.

Still, DEET “will give you the best protection, even if it doesn’t protect as long a duration for a woman as it does for a man,” said Dawn Wesson, an associate professor of tropical medicine at the Tulane University School of Public Health and Tropical Medicine.

Until a few years ago, DEET formulations smelled like a chemical, Dr. Wesson said, and “people have this perception that if it smells this way, it’s not safe, and that’s not true.”

Pregnant women in areas where the Zika virus is spreading are currently at far greater risk than those in the continental United States. The C.D.C. is predicting that a quarter of Puerto Rico’s 3.5 million people may be infected with the Zika virus within a year.

Dr. John Meeker, a professor of environmental health sciences at the University of Michigan School of Public Health, and others are following 1,000 pregnant women in Puerto Rico. They are tracking concentrations of pesticides, including DEET and two of its metabolites, in urine to see if there is any link to adverse pregnancy outcomes.

Like the Science Times page on Facebook.

A version of this article appears in print on April 5, 2016, on page D6 of the New York edition with the headline: Using DEET While Pregnant.

# INSECT REPELLENTS IN THE AGE OF ZIKA

*Our new tests identify what works and what doesn't against the bugs that can spread the virus and other serious diseases*

BY JENEEN INTERLANDI

Your Ultimate Summer Survival Guide



## **Repel Lemon Eucalyptus (30%) \$7.50**

This is the only plant-oil-based repellent that scored among the top three products in our tests. The other two top-scoring repellents were Sawyer Picaridin 20% (score: 96) and Ben's 30% Deet Tick & Insect Wilderness Formula (score: 93).  
**RATING 87**



Scan this page using the Blippar app for a video on the insect repellents that protect against Zika (see page 7 for details).

PHOTOGRAPH BY JAMIE CHUNG

PROP STYLING: MEGUMI ENOTO

SINCE EMERGING IN BRAZIL in early 2015, the Zika virus has now spread to more than 40 countries in the Western Hemisphere. It's a troubling and widespread global outbreak—and it's the first of its kind. If you live on the mainland U.S., health officials say you probably don't need to panic. But you should still be alert to the threat and take some extra precautions this summer.

The virus can cause microcephaly, a birth defect marked by an abnormally small head and developmental deficits. Doctors still don't know how often the virus causes those problems, but they say Zika is the first pathogen in 50 years to trigger birth defects, and the first mosquito-borne disease ever to do so.

We've seen microcephaly before, notably during the rubella epidemic of 1964. But the Zika-related version is so much worse that doctors have started referring to it by a different name altogether: fetal brain disruption sequence.

"I have never seen anything like this," says James Sejvar, M.D., a neuroepidemiologist with the Centers for Disease Control and Prevention. Babies born with Zika-related microcephaly have significantly smaller heads than those born with other forms of the disorder, he says. And their brains are much more damaged.

The virus can also spread through sexual intercourse and has, in rare cases, been linked to serious neurological disorders in adults, including Guillain-Barré syndrome, which can cause paralysis, sometimes permanently.

Zika isn't the only bug-borne threat this summer. Dengue is now common in Puerto Rico and the U.S. Virgin Islands, and sporadic outbreaks have been reported in Florida, Hawaii, and Texas. West Nile virus still infects thousands each year and has caused 1,700 deaths in the U.S. since 1999. And tick-borne illnesses such as Lyme and Rocky Mountain spotted fever are increasing in incidence and geographic range.

But it's Zika that has filled health officials with dread and sent them scrambling to update mosquito-control protocols. Because anyone bitten can



## WHAT YOU NEED TO KNOW ABOUT ZIKA

As mosquito season peaks, researchers are racing to answer many questions about Zika. Why do some people who are bitten develop symptoms but not others? If a pregnant woman is infected, what's the likelihood that she'll pass the virus to her fetus? Are Zika-infected babies born without microcephaly at risk for other developmental delays later in life? Here are some things we do know:

Local transmission—when mosquitoes are infected and spread the disease—is already a reality in Puerto Rico, the U.S. Virgin Islands, and American Samoa. Experts don't anticipate an epidemic on the U.S. mainland, but they do expect local outbreaks, especially in poorer communities and along the Gulf Coast. The scope of those outbreaks will depend on how contagious the disease proves to be, how fast people develop immunity to it, and how swiftly mosquito-control measures are put in place.

The Centers for Disease Control and Prevention advises women of childbearing age to avoid Zika-affected countries if they can. They should also take several precautions if they must travel there or if they live in an affected area.

Zika can be transmitted sexually, so if you're pregnant, use condoms every time for all forms of sex, or consider abstaining for the duration of the pregnancy. If you're hoping to conceive, wait eight weeks (six months for men) after possible exposure before having unprotected sex.

If you go to a Zika hot spot, use repellent for at least three weeks after returning to prevent local mosquitoes from picking up the virus from you and passing it on.

become an unwitting carrier of the disease, even those not trying to become pregnant need to be vigilant against mosquito bites this season.

Ridding yards of standing water will deprive mosquitoes of their breeding grounds, and not letting grass grow too high will help keep ticks at bay. Choosing the right insect repellent will prevent bites when other precautions fail.

Consumer Reports tested products to see which work best against the Aedes mosquitoes that spread Zika as well as against Culex mosquitoes, which spread West Nile, and the ticks that carry Lyme. Here's what we found:

### The Best Repellents

We looked at 16 repellents with a range of active ingredients, including conventional chemicals like deet, synthetic plantlike compounds that resemble those found in nature, and plant oils like citronella and rosemary.

Three insect repellents qualified as Consumer Reports Top Picks: Sawyer Picaridin (20%), Ben's 30% Deet Tick & Insect Wilderness Formula, and Repel Lemon Eucalyptus (30%). Once applied, they were able to ward off Aedes and Culex mosquitoes, plus ticks, for at least 7 hours.

Most products performed equally against both species, but some didn't work as well against the Zika-carrying Aedes mosquitoes as they did against others. For example, Repel Scented Family and Skin-So-Soft Bug Guard warded off Culex mosquitoes for 8 hours but stopped Aedes mosquitoes for only 5 and 3 hours, respectively.

We also found that when choosing a repellent, it's important to look at more than just the ingredients. For example, our top-rated product contains picaridin, but so does the one that came in second to last. That's probably due in part to different concentrations. The high-scoring product is 20 percent picaridin; the low-scoring one, just 5 percent. But higher concentrations aren't always better. A 15 percent deet product outperformed one with 25 percent deet against deer ticks, maybe because of its "inactive" ingredients.



## KEEP BUGS AT BAY

*Effective bug avoidance requires more than repellent.*

**YOUR CLOTHES** Wear socks with close-toed shoes; loose, long sleeves and pants (mosquitoes can bite through tight clothes), and avoid dark colors (light-colored clothes make it easier to spot ticks). Tuck your shirt into your pants and pants into your socks. Shower when you get home, then inspect your skin and use tweezers to remove ticks. For extra safety, toss clothes into a dryer on high heat to kill stragglers.

**YOUR HOUSE** Make sure door and window screens are hole-free. Use an air conditioner or fan if you can.

**YOUR DECK** Our tests last year of two area repellents—citronella candles and a battery-powered diffuser that blows out geraniol—showed they were ineffective at keeping mosquitoes away. But an oscillating pedestal fan on high cut mosquito landings by 45 to 65 percent, at least among people close to it.

**YOUR YARD** To prevent mosquitoes from breeding, clear ivy and leaves, and keep water from pooling in gutters, tires, wheelbarrows, wading pools, and swimming pool covers. Ticks prefer tall grass and shade, so keep your lawn mowed, remove leaves and debris, and let as much sun into your yard as possible. Consider fencing your property to keep out deer and other animals that carry ticks. And check your cats and dogs for ticks, and use repellents approved for pets.



## MOSQUITO-BORNE DISEASES

### CHIKUNGUNYA

**How Common?** No local cases on U.S. mainland in 2015; 202 cases in U.S. territories.

**Where?** Puerto Rico and the U.S. Virgin Islands.

**Symptoms?** Fever, headache, and joint pain three to seven days after a bite.

**Serious Effects?** Usually only in people with other health problems, such as diabetes or heart disease.

**Treatment?** None. Acetaminophen and fluids to ease symptoms; no aspirin or related drugs such as ibuprofen.

### DENGUE

**How Common?** 211 local cases in 2015; 46 cases in U.S. territories.

**Where?** Florida, Hawaii, Puerto Rico, and the U.S. Virgin Islands.

**Symptoms?** Fever, rash, and severe eye, bone, joint, and muscle pain four to seven days after a bite.

**Serious Effects?** Severe damage to the body's blood vessels leading to bleeding and sometimes death.

**Treatment?** None. Acetaminophen and fluids to ease symptoms; no aspirin or related drugs such as ibuprofen.

### WEST NILE

**How Common?** 2,060 local cases in 2015.

**Where?** Every state except Alaska and Hawaii.

**Symptoms?** Fat, red rash with small bumps two to 14 days after a bite, followed by headache, fatigue, and back pain.

**Serious Effects?** In rare cases, inflammation of the brain or surrounding tissue, which can be fatal.

**Treatment?** None. To ease symptoms, fluids and over-the-counter pain relievers such as aspirin, ibuprofen, or naproxen.

### ZIKA

**How Common?** No local cases on the U.S. mainland as of May 2016; 596 cases in U.S. territories.

**Where?** Puerto Rico, American Samoa, the U.S. Virgin Islands. Outbreaks expected in summer, especially in Gulf Coast states.

**Symptoms?** Fever, rash, joint pain, and pinkeye two to 14 days after a bite. **Serious Effects?** Birth defects and developmental delays; in adults, Guillain-Barré.

**Treatment?** None. Acetaminophen and fluids; no aspirin or related drugs.



## TICK-BORNE DISEASES

### BABESIOSIS

**How Common?** 1,759 cases in 2014.

**Where?** Mostly in the Northeast and upper Midwest.

**Symptoms?** Fever, chills, headache, body aches, and loss of appetite one to five weeks after a bite.

**Serious Effects?** Blood clots and severe anemia, sometimes fatal.

**Treatment?** The antibiotic azithromycin plus the antiparasitic atovaquone or, in severe cases, the antibiotic clindamycin plus quinine.

### EHRlichiosis/ ANAPLASMOSIS

**How Common?** 4,488 cases in 2014.

**Where?** Mostly in the Southeast and South Central (ehrlichiosis), and the Northeast and upper Midwest (anaplasmosis).

**Symptoms?** High fever and severe headache, fatigue, and muscle aches seven to 14 days after a bite.

**Serious Effects?** In rare cases, difficulty breathing, bleeding disorders, and death.

**Treatment?** The antibiotic doxycycline as soon as symptoms appear.

### LYME

**How Common?** About 300,000 cases in 2015.

**Where?** Mostly in the Northeast and upper Midwest.

**Symptoms?** "Bulls-eye" rash with fatigue, chills, fever, headache, and muscle and joint pain three to 30 days after a bite.

**Serious Effects?** In rare cases, lasting joint pain, neurologic damage, facial paralysis, or heart damage.

**Treatment?** Antibiotics (usually doxycycline or amoxicillin) as soon as symptoms appear.

### ROCKY MOUNTAIN SPOTTED FEVER

**How Common?** 3,647 cases in 2014.

**Where?** Mostly in Arkansas, Missouri, North Carolina, Oklahoma, and Tennessee.

**Symptoms?** Fever, headache, stomach pain, vomiting, muscle pain, and rash two to 14 days after a bite.

**Serious Effects?** Heart damage, kidney failure, and if not treated within five days, sometimes death.

**Treatment?** Doxycycline as soon as symptoms appear.

**Note:** All cases are for infections from insect bites in the U.S., not while traveling abroad or from sexual transmission. Mosquito-borne diseases other than Zika are those reported to the Centers for Disease Control and Prevention for 2015; Zika cases are those reported as of May 2016. Tick-borne cases other than Lyme are for 2014; Lyme cases are estimates from the CDC. The CDC says that for all diseases, reported cases are probably less than the actual number.



Scan this page using the Blippar app for a video on the insect repellents that protect against Zika (see page 7 for details).

## RATINGS: Insect Repellents That Battle Disease-Carrying Bugs

Of the 16 repellents we tested, those with 20 percent picaridin, 30 percent oil of lemon eucalyptus, or 15 to 30 percent deet worked best. We don't recommend repellents above 30 percent deet because they may pose greater risks, and lower concentrations can provide excellent protection.

CR Best Buy  Recommended

⊕ Excellent ⊕ Very Good ○ Good ⊖ Fair ⊖ Poor

Recommended	Rank	PRODUCT	PRICE	SCORE	Effectiveness (Hrs.)			Avoids Damage to Materials	Active Ingredients	Type	
					Cost Per Oz. (\$)	Aedes Mosquitoes	Culex Mosquitoes				Deer Ticks
<input checked="" type="checkbox"/>	1	Sawyer Picaridin	\$8.25	\$2.06	96	8	8	8.5	○	Picaridin 20%	Pump Spray
<input checked="" type="checkbox"/>	2	Ben's 30% Deet Tick & Insect Wilderness Formula	\$8	\$1.33	93	7.5	8	8.5	○	Deet 30%	Aerosol
<input checked="" type="checkbox"/>	3	Repel Lemon Eucalyptus	\$7.50	\$1.88	87	7	8	7	⊖	Oil of lemon eucalyptus 30% (Approx. 65% p-menthane-3,8-diol)	Pump Spray
<input checked="" type="checkbox"/>	4	Repel Scented Family	\$7	\$1.08	82	5	8	8.5	○	Deet 15%	Aerosol
<input checked="" type="checkbox"/>	5	Natrapel 8 Hour	\$9	\$1.50	81	8	8	6	○	Picaridin 20%	Aerosol
<input checked="" type="checkbox"/>	6	Off Deepwoods VIII	\$6.50	\$1.63	74	8	8	5	○	Deet 25%	Aerosol
	7	Coleman SkinSmart	\$8	\$1.33	69	3	6	8	○	3-(N-Butyl-acetyl)-amino propionic acid ethyl ester IR3535 20%	Aerosol
	8	Avon Skin-So-Soft Bug Guard plus Picaridin	\$14	\$3.50	62	3	8	7	○	Picaridin 10%	Pump Spray
	9	Cutter Skinsations	\$4.50	\$0.75	33	1	3	6	○	Deet 7%	Pump Spray
	10	HOMS Bite Blocker BioUD Mini Trigger	\$8.95	\$1.49	31	3	3.5	3	⊖	2-Undecanone (CAS # 112-12-9) 7.75%	Pump Spray
	11	Cutter Natural	\$5	\$0.83	29	1.5	.5	8	⊖	Geraniol 5%, soybean oil 2%, sodium lauryl sulfate 0.4%, potassium sorbate 0.1%	Pump Spray
	12	Burt's Bees Herbal	\$8	\$2	28	1	1.5	6	⊖	Castor oil 10%, rosemary oil 3.77%, lemongrass oil 2.83%, cedar oil 0.94%, peppermint oil 0.76%, citronella oil 0.57%, clove oil 0.38%, geranium oil 0.19%	Pump Spray
	13	All Terrain Kids Herbal Armor	\$10	\$2.50	23	.5	1	6.5	○	Oil of soybean 11.5%, oil of citronella 10%, oil of peppermint 2%, oil of cedar 1.5%, oil of lemongrass 1%, oil of geranium 0.05%	Pump Spray
	14	California Baby Natural Bug Blend	\$15.80	\$2.43	22	.5	.5	7	⊖	Pure essential oils of cymbopogon nardus (citronella) 5%, cymbopogon schoenanthus (lemongrass) 0.5%, cedrus atlantica (cedar) 0.5%	Pump Spray
	15	Off FamilyCare II Clean Feel	\$6	\$1	18	.5	1	5	⊖	Picaridin 5%	Pump Spray
	16	EcoSmart Organic	\$7	\$1.17	7	.5	.5	1.5	⊖	Geraniol 1.0%, rosemary oil 0.5%, cinnamon oil 0.5%, lemongrass oil 0.5%	Pump Spray

### DO 'NATURAL' REPELLENTS WORK?

Many of them don't, so choose carefully.

It might seem like a good idea, especially if you're pregnant or hoping to be: Choose a "natural" bug repellent. But five of the six plant-oil-based repellents we tested lasted an hour or less against Aedes mosquitoes, the kind that can spread Zika.

The exception was Repel Lemon Eucalyptus (30%), which warded off Aedes mosquitoes

for 7 hours. Several other repellents also did well and are safe for pregnant women: those with 20 percent picaridin (a synthetic compound resembling a chemical in the black pepper plant) and those with 15 to 30 percent deet.

But even those products can cause side effects, especially if you apply too much or too often.

For example, they can all cause rashes and skin irritation, and deet may cause disorientation.

So use all repellents with care. Apply just enough to cover exposed skin. Don't use it on wounds or broken skin, or under clothes. For your face, spray it on your palms, then rub it in, avoiding your eyes and mouth. Adults should put it on children.

## Fight the Bite for Protection from Malaria Guidelines for DEET Insect Repellent Use

### What is DEET?

DEET (chemical name N,N-diethyl-meta-toluamide) is used as the active ingredient in many insect repellents. Insect repellents that contain DEET offer the best protection against mosquito bites. DEET is designed for direct application to skin to repel insects, rather than kill them. Products containing DEET currently are available to the public in a variety of liquids, lotions, sprays, and impregnated materials (e.g., wrist bands). Concentrations of DEET in products that are designed for application to skin range from 4% to 100%.



### What does the DEET concentration mean?

The concentration of DEET in a product indicates how long the product will be effective. A higher concentration does not mean that the product will work better; it means that it will be effective for a longer period of time. Therefore, products containing lower concentrations of DEET may need to be reapplied, depending on the length of time a person is outdoors.

### Can DEET use cause health problems?

Using insect repellents containing DEET should not be harmful if label directions are followed and the product is used safely. In rare cases, using DEET products may cause skin rashes. Some persons who used products containing a high concentration of DEET or who were exposed to excessive amounts of DEET have experienced skin rashes, blisters, and skin and mucous membrane irritation.

### When using repellent with DEET, follow these recommendations:

- Read and follow all directions and precautions on the product label.
- Store DEET out of reach of children.
- To apply to face, first spray product onto hands, then rub onto face.
- Use only when outdoors and wash skin with soap and water after coming indoors.
- Higher concentrations of DEET may have a longer repellent effect, however, concentrations over 50% provide no added protection.
- Use just enough repellent to cover exposed skin and/or clothing. Avoid over-application of the product.
- DEET may be used on adults, children, and infants older than 2 months of age. Protect infants from mosquito bites by using a carrier draped with mosquito netting with an elastic edge for a tight fit.

### Be safe with DEET :

- Do not allow children under 10 years of age to apply repellent themselves.
- Do not apply to young children's hands or around eyes and mouth.
- Do not breathe in, swallow, or get into the eyes (DEET is toxic if swallowed.)
- Do not put repellent on wounds or broken skin.