

## Special Interest Articles:

- Vistogard
- Fluoroquinolone Restrictions
- Insect Repellents



## Did you know?

The FDA has approved a brand name change for the antidepressant Brintellix (vortioxetine) to decrease the risk of prescribing errors resulting in name confusion with the blood-thinner Brilanta (ticagrelor). The new name will be Trintellix.

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## Vistogard – New 5-FU Antidote

Vistogard (uridine triacetate) is the first and only drug to treat patients following an overdose of chemotherapy drugs 5-fluorouracil (5-FU) or capecitabine, or in patients exhibiting early-onset, severe or life-threatening toxicity affecting the cardiac or central nervous system, and/or early-onset, unusually severe adverse reactions (e.g., gastrointestinal toxicity and/or neutropenia) within 96 hours following the end of 5-FU or capecitabine administration. Uridine triacetate is rapidly converted to uridine by deacetylation. Uridine is then converted to uridine triphosphate (UTP), which competes with 5-FU metabolites for incorporation into RNA; thus preventing cell death and toxicity. Fluorouracil (5-FU) is an antineoplastic used in the management of carcinoma of the

esophagus, head and neck, colon, rectum, breast, stomach, and pancreas. Capecitabine is a prodrug of fluorouracil, used in the treatment of colorectal cancer and metastatic breast cancer refractory to paclitaxel and anthracycline-containing chemotherapy as adjuvant therapy in patients with Dukes' C colon cancer and metastatic colorectal cancer. Overdose of 5-FU is typically due to a medication error (ie, malfunction or incorrect programming of the intravenous pump) and is rare, but can be fatal, if it occurs. Vistogard dosage for adults is 10 grams (1 packet) orally every 6 hours for 20 doses, without regard to meals. Pediatric dosage is 6.2 grams/m<sup>2</sup> of body surface area (not to exceed 10 grams per dose) orally every 6 hours for 20 doses, without regard to meals.

## FDA Advises Restriction of Fluoroquinolone Use

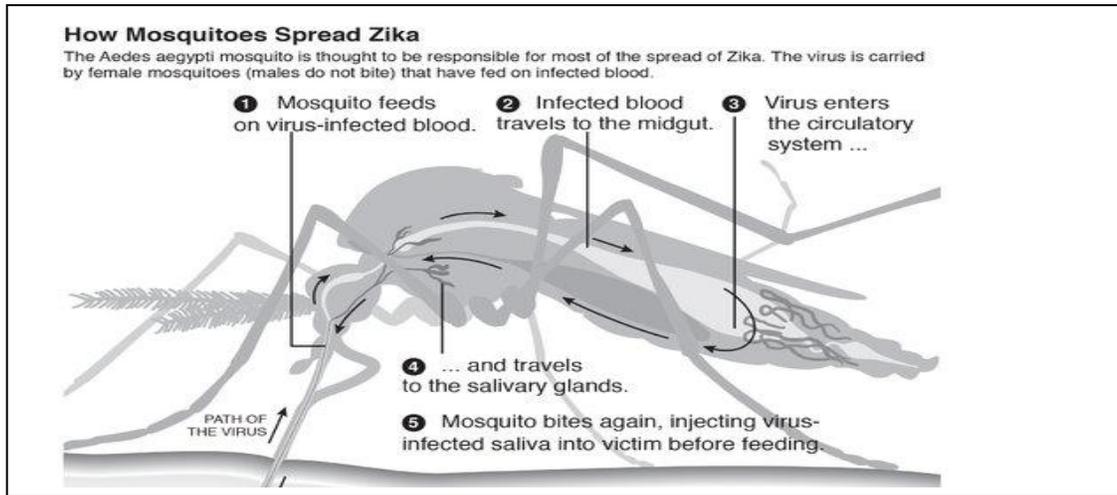
On May 12, 2016, the U.S. Food and Drug Administration (FDA) advised that the serious adverse effects associated with fluoroquinolone antibacterial drugs generally outweigh the benefits for patients with sinusitis, bronchitis, and uncomplicated urinary tract infections who have other treatment options. For people with these conditions, the agency said the drugs should be reserved for those with no other treatment options. According to an FDA safety review, systemic use of fluoroquinolones is associated with

disabling and potentially permanent serious adverse effects. The adverse effects may involve the tendons, muscles, joints, nerves, and central nervous system. FDA said it is requiring the drug labels and medication guides for all fluoroquinolone antibacterial drugs to be updated to reflect the new safety information, and it will continue to investigate safety issues associated with the drugs.

# Zika Virus Disease and Mosquito Transmission

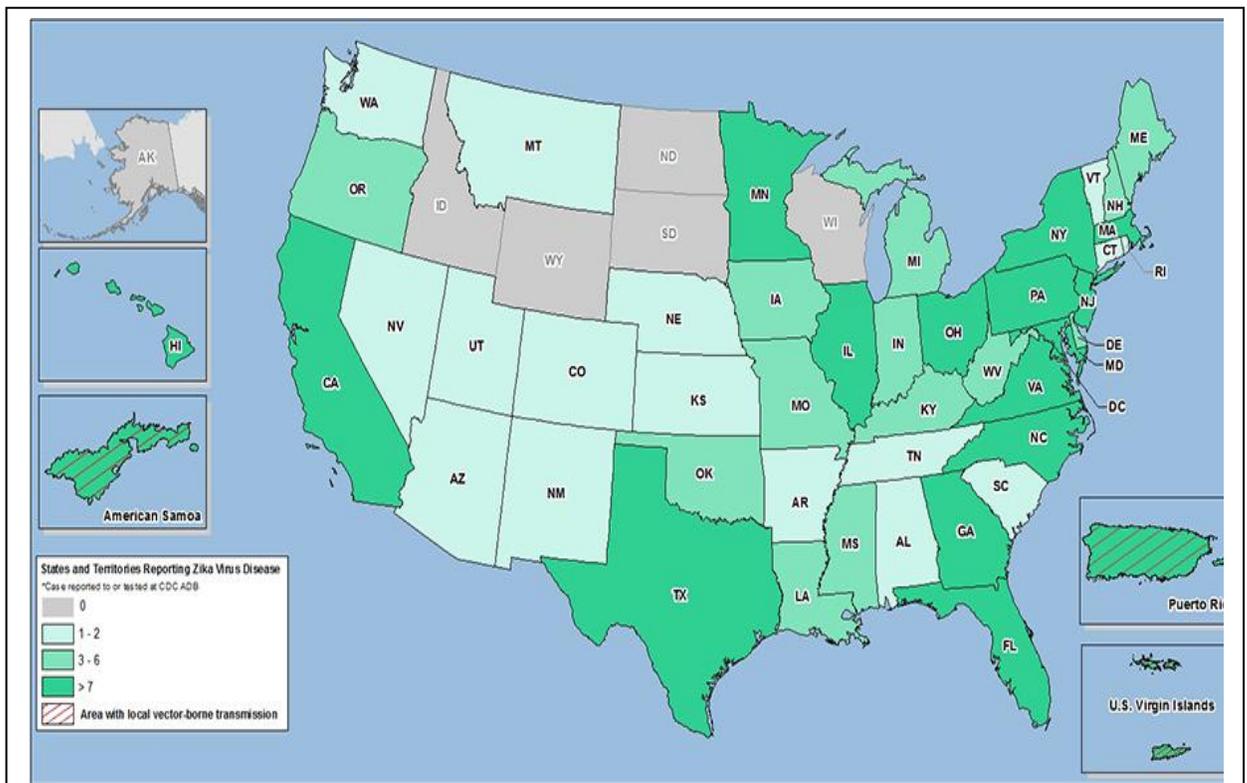
## Becky Rozier BSN, RN, CSPI

The Zika virus is transmitted to people by a mosquito bite from an infected *Aedes* species mosquito. The *Aedes* mosquito is an aggressive daytime biter but also bites at night and becomes infected by feeding on an infected human. While most humans are infected by being bitten by an infected mosquito, there are other less common forms of transmission- an infected pregnant person to her fetus, sexually transmitted from a male to his partners, and through blood transfusions.



Source: Dr. W. Augustine Dunn; Oxitec; The Anatomical Life of the Mosquito, RE Snodgrass

The Zika virus can cause symptoms such as fever, rash, joint pain, and conjunctivitis lasting several days to weeks. Symptoms are generally mild, resulting in infrequent hospitalization, and Zika is rarely fatal. However, during pregnancy, it can cause fetal microcephaly as well as severe brain defects. The *Aedes* species mosquitoes not only transmit Zika virus, but also Dengue and the Chikungunya virus. The *Anopheles* species mosquito transmits the West Nile Virus and malaria.



Laboratory-confirmed Zika virus disease cases reported to ArboNET by state or territory — United States, 2015–2016 (as of May 18, 2016)



## Insect Repellents

Concerns about the mosquito-borne Zika virus will raise questions about how to choose and use insect repellent. The following chart shows products that are all safe in pregnancy. Here are some guidelines for patients:

- Do not allow young children to apply repellent themselves.
- Do not apply to young children's hands or around eyes and mouth. Adults should spray into hands and then apply on child's face.
- Cover up with pants and long sleeves when possible, especially if you need protection from both sun and mosquitoes. Spray clothes with insect repellent.
- Wash your hands after applying repellent; wash repellent-coated skin at the end of the day.
- Use an Environmental Protection Agency (EPA)-registered insect repellent with one of the following active ingredients. When used as directed, EPA-registered insect repellents are proven safe and effective, even for pregnant and breastfeeding women.

Repellent	Application	Comments
DEET (chemical name: N,N-diethyl-m-toluamide) Examples: Off, Cutter, Repel, Bug X, Ultrathon (controlled release product)	The duration of mosquito protection varies with concentration. For e.g., DEET 23.8% provides about 5 hours of protection. A lesser concentration can be used for shorter duration outdoors.  The chemical tends to leave an oily residue on the skin, and may dissolve plastic or other synthetic materials such as clothing, wrist watches and other objects.	Considered the "gold standard" for repelling mosquitoes, against which other insect repellents are compared  Considered safe for use on children two months of age and older. Children should use 10-30% DEET.  Considered safe for pregnant women up to 30%.
Picaridin Example: Avon Skin-So-Soft Bug Guard Plus Picaridin	20% protects up to seven hours against mosquitoes  Picaridin has not been approved for ticks.	Several published studies found as effective to similar concentrations of DEET  Safe for children 2 months of age and older  Safe for pregnant women.
IR3535 (Insect Repellent 3535) Example: Skin-So-Soft Bug Guard Plus Insect Repellent  Pregnancy Category B	Some studies have found IR3535 protected against mosquitoes from 0-3 hours	Considered safe for use on children two months of age and older  Choose a repellent with 20% concentration in pregnant women.  IR3535 is a strong eye irritant.
Oil of lemon eucalyptus (OLE) or PMD (para-menthane-3,8-diol) Example: Repel, Off! Botanicals, Cutter	Oil of lemon eucalyptus is the only essential oil that has been recommended by the CDC as being an effective alternative to DEET.  Most products claim to offer protection up to 6 hours.	Not for kids younger than 3 years old.  Can cause skin irritation in patients predisposed to allergic dermatitis.  Pure oil of lemon eucalyptus (essential oil not formulated as a repellent) is not recommended and is not registered as an EPA insect repellent.  Lemon eucalyptus oil should not be a pregnant woman's first choice of insect repellent.

"Do not apply to young children's hands or around eyes or mouth. Adults should spray into hands and then apply on child's face."

### References

1. PL Detail-Document, Comparison of Insect Repellents. Pharmacist's Letter/Prescriber's Letter. April 2016.
2. Nasci RS, Wirtz RA, Brogdon WG. Chapter 2. Protection against mosquitoes, ticks, and other arthropods. In: The Yellow Book Online. 2016.
3. EWG's Guide to Bug Repellents in the Age of Zika: Pregnant Women. (2016, April 18). Retrieved from: <http://www.ewg.org/research/ewgs-guide-bug-repellents/pregnant>

# Toxicity of Insect Repellents

**LaDonna Gaines BSN, RN, CSPI**

Insect repellents offer strong protection against the *Aedes* mosquito. The following is a guideline of repellent toxicity and treatment.

Repellent	Routes of Exposure	Symptoms	Treatment
<b>DEET</b> (chemical name: N,N-diethyl-m-tolua-mide)	<b>Oral</b>	<b>Minor</b> -Nausea, vomiting, abdominal pain <b>Severe</b> - encephalopathy with seizures, hypotension, coma, movement disorders, bradycardia, ataxia, toxic hepatitis, death	GI decontamination is not usually recommended Treatment is symptomatic and supportive care Treat seizures with benzodiazepines Obtain and monitor electrolytes, liver function tests and blood glucose in patients with central nervous system symptoms
	<b>Dermal</b>	<b>Minor</b> -Contact dermatitis, generalized urticaria <b>Severe</b> -Encephalopathy with seizures, hypotension, coma, movement disorders, bradycardia, ataxia, toxic hepatitis, and death	Wash the skin with soap and water Topical steroids and oral antihistamines may be used for severe dermal reactions
	<b>Ocular</b>	<b>Minor</b> -Irritation	Flushing with profuse amounts of saline or water
<b>Picaridin</b> (KBR 3023)	<b>Oral</b>	No reports of serious toxicity	May dilute with small amounts of clear fluids
	<b>Dermal</b>	<b>Minor</b> -contact dermatitis with erythema and pruritis	Wash the skin with soap and water
	<b>Ocular</b>	<b>Minor</b> -Irritation	Flushing with profuse amounts of saline or water
<b>IR3535</b> (chemical name: ethyl butylacetylaminopropionate)	<b>Oral</b>	No reports of serious toxicity	May dilute with small amounts of clear fluids
	<b>Dermal</b>	No reports of skin reactions	Wash the skin with soap and water
	<b>Ocular</b>	<b>Minor</b> -irritation	Flushing with profuse amounts of saline or water.
<b>Oil of Lemon Eucalyptus</b> (OLE)	<b>Oral</b>	<b>Minor</b> -epigastric pain, vomiting, diarrhea <b>Severe</b> -CNS depression, tachycardia, cyanosis, hypotension, seizures, death, and chemical pneumonitis via aspiration	Symptomatic/Supportive Care Treat seizures and delirium with benzodiazepines Obtain chest radiograph and monitor ABGs
	<b>Dermal</b>	<b>Minor</b> -Irritation	Wash the skin with soap and water
	<b>Ocular</b>	<b>Minor</b> -Irritation (vapor) <b>Severe</b> -Severe pain and/or blepharospasm (liquid), leading to hyperemia and damage of the corneal epithelium	Flushing with profuse amounts of saline or water Follow up with ophthalmology as needed

*References:*

1. Roberts, J. R., & Reigart, J. R. (1999). *Recognition and management of pesticide poisonings*. National Pesticide Telecommunications Network.
2. Diaz JH. Chemical and plant-based insect repellents: efficacy, safety, and toxicity. *Wild Environ Med* 2016;27:153-63.
3. Diethyltoluamide, Picaridin, Eucalyptus Oil. (2016). In *Micromedex* (Columbia Basin College Library ed.) [Electronic version]. Greenwood Village, CO: Truven Health Analytics. Retrieved May, 2016, from <http://www.micromedexsolutions.com/>