



District Health Department #10



REPORT TO THE BOARDS OF HEALTH

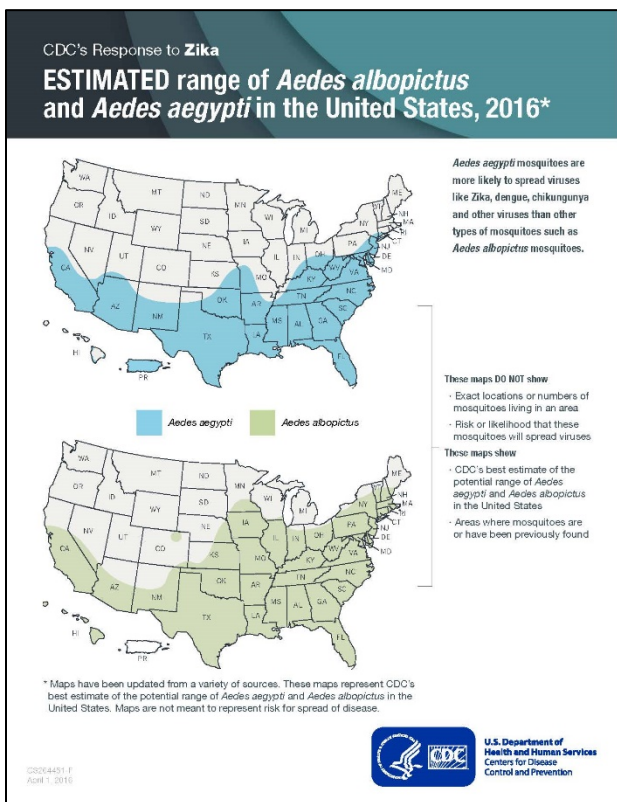
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Mid-Michigan District Health Department, Wednesday, April 26, 2017
Central Michigan District Health Department, Wednesday, April 26, 2017
District Health Department #10, Friday, April 28, 2017

Mosquitos and Health

The deadliest animal on earth isn't a crocodile, dog, or even man – *it is the mosquito*. It is estimated mosquitos are responsible for approximately 725,000 deaths globally each year.¹ Mosquitos are dangerous due to the diseases they can carry. Malaria is the major cause of death, killing an estimated 429,000 of the 212 million infected worldwide.² While malaria is caused by a parasite, most illnesses spread by mosquitos are arboviruses. An arbovirus is any virus that is transmitted by an arthropod (insect) such as a mosquito, tick, or other.

An arbovirus is any virus that is transmitted by an arthropod (insect) most commonly blood-sucking insects such as a mosquitos and ticks.



In Michigan, mosquitos are responsible for transmitting the arboviruses West Nile virus, St. Louis encephalitis, Eastern equine encephalitis, and the California group of encephalitis viruses (which includes La Crosse encephalitis).³ These viruses affect animals as well as humans, and mosquitos also spread heartworms to dogs. Other important illnesses caused by mosquitos around the world include yellow fever, chikungunya, dengue, and Zika.

Due to the global environment in which we live, all of these diseases have been diagnoses in the United States in travelers. Chikungunya, dengue and Zika have started to spread to the southernmost parts of Florida and Texas and locally acquired infections have been diagnosed in those areas. Any Michigander that travels must be aware of these illnesses and how to prevent contracting them.

There are over 2,500 different types of mosquitos worldwide, and at least 60 different species in Michigan³.

Michigan still contains the mosquitos known to carry malaria. Due largely to climate change and warmer winters, it is expected the Asian tiger mosquito, *Aedes albopictus*, will significantly expand its range into the northeastern U.S. over the next few decades.⁴ This mosquito is a very aggressive feeder and can spread many of the viruses already present in

¹ Gates, B. (2014, April 25). The Deadliest Animal in the World. Retrieved April 11, 2017, from https://www.gatesnotes.com/Health/Most-Lethal-Animal-Mosquito-Week?WT.mc_id=MosquitoWeek2014_SharkWeek_tw&WT.src=Twitter

² World Health Organization (WHO). (2016, December 13). Fact Sheet: World Malaria Report 2016. Retrieved April 13, 2017, from <http://who.int/malaria/media/world-malaria-report-2016/en/>

³ Michigan Mosquito Control Association (MMCA). (n.d.). Michigan Mosquito Control Association Website. Retrieved April 14, 2017, from <http://www.mimosq.org>

⁴ Rochlin, I., Ninivaggi, D. V., Hutchinson, M. L., & Farajollahi, A. (2013). Climate change and range expansion of the Asian tiger mosquito (*Aedes albopictus*) in Northeastern USA: implications for public health practitioners. *PLoS one*, 8(4), e60874.

Michigan as well as chikungunya, dengue, and Zika.⁴ Therefore, these serious illnesses are only a flight away now, and may be at our doorstep before we know it.

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There are things you can do. First, if you do travel, be aware of what health risks may be present. Go to <https://wwwnc.cdc.gov/travel/> and enter your destination to receive recommendations. Do this as early as possible in your travel plans, as you may need a series of vaccinations that may take 6 months to complete. If you are going to an area with Zika virus, and you could become pregnant or are a male having sex with someone that could become pregnant, you need to discuss your travel plans with your health care provider. For Zika travel tips and mosquito prevention tips, see <https://www.cdc.gov/zika/prevention/plan-for-travel.html>. For an interactive tool to select the best insect repellent for your needs, see <https://www.epa.gov/insect-repellents/find-insect-repellent-right-you>.

The prevention of mosquito bites is well summarized in a handout from the American Mosquito Control Association, at <http://www.mosquito.org/assets/amca%20fact%20sheet%20v2%20web.pdf> (*reproduced next page.*) It covers the 3 D's: Drain, Dress, and Defend. Draining of water is to eliminate habitats suitable for mosquitoes to lay eggs and for mosquito larva to develop. Any amount of water can act as a breeding ground and artificial containers in yards account for a large portion of the mosquito population in the summer in urban areas.³ If larva has been found to be present above threshold levels in water that cannot or should not be drained, larvicidal chemicals may need to be used. It is much easier to kill mosquitos as larva than as adults. There are chemicals available to kill adult mosquitos; however, a challenge with any pesticide is that mosquitos have been developing resistance. This is a major problem in other countries where aggressive mosquito control efforts have been used in attempts to control malaria.

Different biologic methods have been used and are being evaluated to control mosquitos. The mosquito fish (*Gambusia affinis*), which eats mosquito larva, has been used since the 1940s.³ A parasite called *Romanomermis culicivorax* has also been used to kill larva with some success.³ Genetic alterations to male mosquitos, causing them to be sterile, then releasing them into the population leading to unsuccessful mating sessions, has shown some success.³ Two bacteria in the *Bacillus* species have been used for years to infect and kill the larva and have been successful.³

Useful Resources

- Michigan Mosquito Control Association: <http://www.mimosq.org/default.html>
- Michigan Emerging Diseases (includes West Nile, Eastern Equine, Zika, and others): www.michigan.gov/emergingdiseases/
- American Mosquito Control Association: <https://amca.memberclicks.net/>
- CDC: Avoid Mosquito Bites:
 - <https://www.cdc.gov/features/stopmosquitoes/index.html>
 - Chikungunya: <https://www.cdc.gov/chikungunya/>
 - Dengue: <https://www.cdc.gov/dengue/>
 - Malaria: <https://www.cdc.gov/malaria/>
 - Yellow Fever: <https://www.cdc.gov/yellowfever/>

Board of Health Monthly Healthy Living Recommendations:

1. Be aware of the evolving health concerns associated with mosquitos at home and when traveling.
2. Practice “Drain, Dress, Defend” mosquito prevention and protection.



Mosquito Prevention and Protection



Always remember the 3 D's of protection from mosquitoes



Drain

Many mosquito problems in your neighborhood are likely to come from water-filled containers that you, the resident, can help to eliminate. All mosquitoes require water in which to breed. Be sure to drain any standing water around your house.

- Dispose of any tires. Tires can breed thousands of mosquitoes.
- Drill holes in the bottom of recycling containers.
- Clear roof gutters of debris.
- Clean pet water dishes regularly.
- Check and empty children's toys.
- Repair leaky outdoor faucets.
- Change the water in bird baths at least once a week.
- Canoes and other boats should be turned over.
- Avoid water collecting on pool covers.
- Empty water collected in tarps around the yard or on woodpiles.
- Plug tree holes.
- Even the smallest of containers that can collect water can breed hundreds to thousands of mosquitoes. They don't need much water to lay their eggs. (bottles, barrels, buckets, overturned garbage can lids, etc.)



Dress

Wear light colored, loose fitting clothing. Studies have shown that some of the 174 mosquito species in the United States are more attracted to dark clothing and most can readily bite through tight-fitting clothing of loose weave. When practical, wear long sleeves and pants.



Defend

Choose a mosquito repellent that has been registered by the Environmental Protection Agency. Registered products have been reviewed, approved, and pose minimal risk for human safety when used according to label directions. Three repellents that are approved and recommended are:

- DEET (N,N-diethyl-m-toluamide)
- Picaridin (KBR 3023)
- Oil of lemon eucalyptus (p-methane 3,8-diol, or PMD)

Here are some rules to follow when using repellents:

- Read the directions on the label carefully before applying.
- Apply repellent sparingly, only to exposed skin (not on clothing).
- Keep repellents away from eyes, nostrils and lips: do not inhale or ingest repellents or get them into the eyes.
- The American Academy of Pediatrics (AAP) suggests that DEET-based repellents can be used on children as young as two months of age. Generally, the AAP recommends concentrations of 10% or less, unless disease risk is imminent, then concentration can be increased to 30% or less.
- Avoid applying repellents to portions of children's hands that are likely to have contact with eyes or mouth.
- Pregnant and nursing women should minimize use of repellents.
- Never use repellents on wounds or irritated skin.
- Use repellent sparingly and reapply as needed. Saturation does not increase efficacy.
- Wash repellent-treated skin after coming indoors.
- If a suspected reaction to insect repellents occurs, wash treated skin, and call a physician. Take the repellent container to the physician.



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