



Prevention is key to keeping mosquito-borne diseases at bay

West Nile virus is the main mosquito-borne disease of concern in Wyoming.

First detected in North America 20 years ago, Wyoming ranks 17th in the number of disease cases reported to the Centers for Disease Control and Prevention (CDC) between 1999 and 2018. It is estimated West Nile resulted in nearly \$800 million in human medical costs from 1999-2012 in the U.S. There is no vaccine or antiviral treatment for humans infected by West Nile virus. Only 20 percent of infected people will exhibit symptoms such as joint pain, vomiting, headache, body ache, weakness, fever, and stiffness.

The cost, prevalence, and asymptomatic features of West Nile

virus require us to rely on diligent prevention. Even though West Nile virus cases have decreased significantly in Wyoming since the peak number of cases in 2003 (Figure 1), personal protection and education are the best ways to prevent contracting West Nile virus.

Ways to reduce contracting diseases

Following the “D’s” of prevention is the best way to limit exposure to all mosquito diseases, including West Nile virus.

Drain

Three of a mosquito’s four life stages require water. Removing any egg-laying habitat will reduce the mosquito population significantly.

Special attention should be given to standing water in areas such as old tires, buckets, gutters, boat covers, and potted plant containers. These sources of water should be emptied at least once per week to prevent eggs from hatching.

For larger sources of water such as ponds, water tanks, and drainage areas, *Bacillus thuringiensis israelensis* (Bti), a bacterial protein, is often used. It is active only on mosquito larva and does not impact other aquatic organisms when applied as directed.

Dress

This prevention measure will likely not agree with those of us wanting a nice summer tan; however, most mosquito bites can be prevented by

wearing long-sleeved shirts, long pants, socks, and shoes. These items should be light-colored and loose-fitting but made of tightly woven material. Several clothing brands offer hats, shirts, and pants specifically for repelling insects. These clothes are typically treated with an insecticide called permethrin and should be worn and laundered as directed. You can also treat your own clothes with permethrin, but it should not be applied directly to skin.

Defend

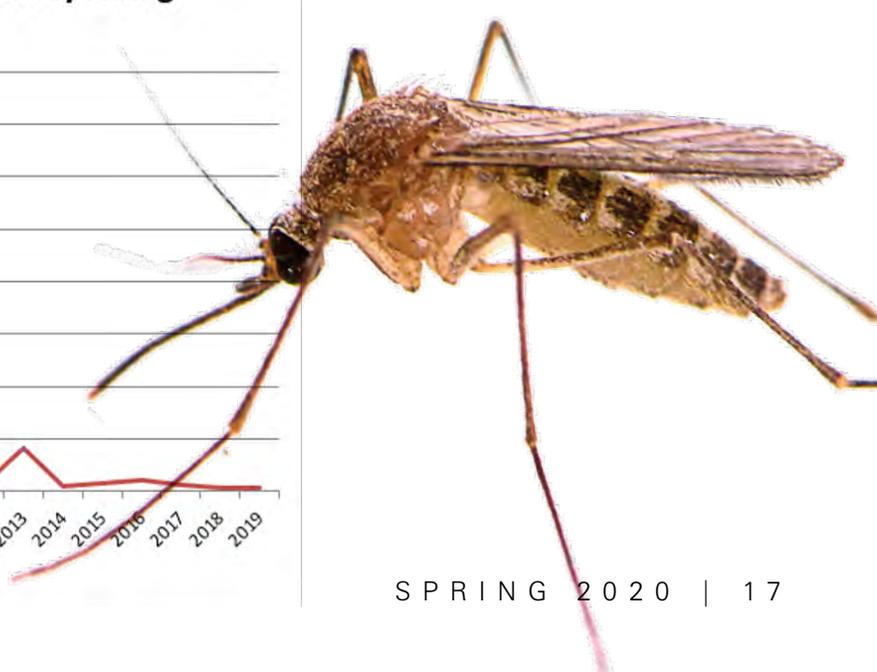
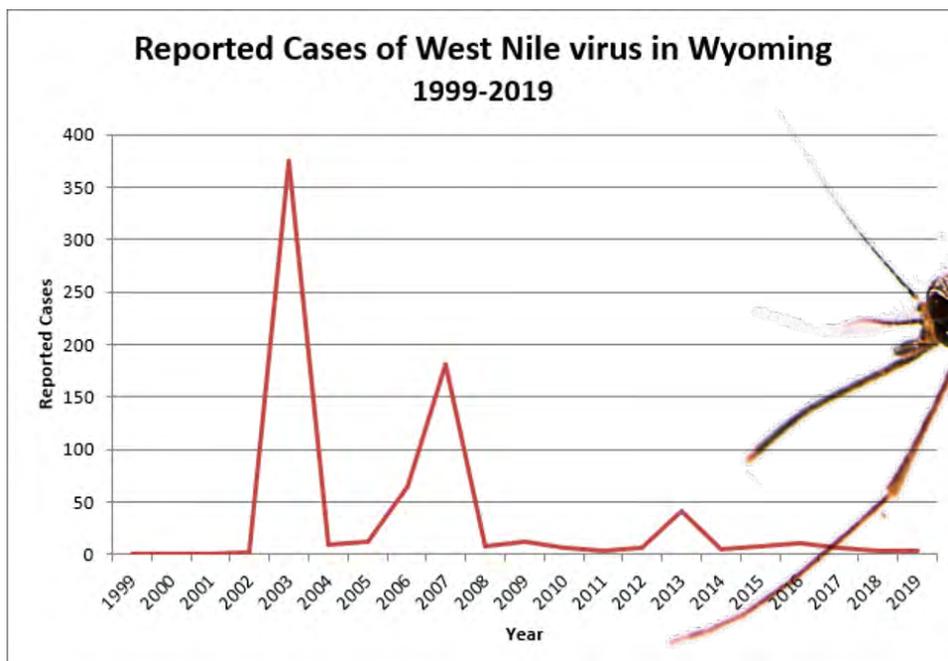
Mosquito repellents should be registered by the Environmental Protection Agency (EPA) and include at least one of the following active ingredients: DEET, picaridin, IR3535, oil of lemon eucalyptus, para-menthane-diol, or 2-undecanone. To be most effective, repellents must be applied according to the label directions. The EPA provides a tool to help determine the best repellent for your needs: <http://bit.ly/rightrepellent4U>.



Humans aren't the only animals susceptible to mosquito-borne diseases

Mosquitoes are responsible for transmitting heartworm disease from one infected animal species to another. Heartworm disease impacts animals such as dogs, cats, foxes, ferrets, seals, and bears. Dogs are affected most severely by heartworm disease as they are the "definitive" host which means the adult parasitic worms complete their life cycle within the dog. While disease incidents are highest in the southeastern U.S., it can be found across the entire country. Incidents are relatively low in Wyoming, but be particularly cautious if you travel with pets and consult your veterinarian with any concerns.

Horses are another animal impacted by mosquito-borne diseases. Various types of encephalitis, such as western equine encephalitis, and West Nile virus can be fatal to infected horses. Vaccinations are available and recommended for equine in Wyoming.



Dawn/dusk

We know different species of mosquitoes transmit different diseases. They also prefer different habitats and feeding times. The *Culex* mosquito (which is the mosquito that transmits the West Nile virus) is most active at dawn and dusk. To reduce exposure to this particular disease, avoid the outdoors during these times or be sure to dress and defend appropriately.

Unfortunately, other mosquitoes in the area are daytime feeders and prefer to bite humans rather than other mammals such as birds and horses. While they may not

transmit disease, other mosquitoes in the area are active during the daytime and prefer to feed on humans rather than other animals. It is recommended to follow the other “D’s” to prevent bites from any mosquito.

Several municipalities and weed and pest districts monitor larval and adult populations of mosquitoes in their local areas. Adult mosquito collections are typically tested for the presence of West Nile virus. Those results are updated weekly during the summer on the Wyoming Department of Health website, badskeeter.com.

Additional information about testing, control measures, and prevention techniques against West Nile virus are available from your local public health department, municipality, or weed and pest district.

Always remember to **drain, dress, and defend – dawn/dusk**.

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We're glad **Jenna Meeks** knows her bad skeeters (is there a good one?) and is on our side! She is the assistant supervisor with the Goshen County Weed and Pest Control District. She can be reached at (307) 532-3713 or at gocoweeds@gmail.com.

Cooler climate buffers Wyoming from many disease-carrying mosquito species

Malaria, chikungunya, yellow fever, dengue fever, Zika virus, and West Nile virus are all potentially fatal diseases transmitted by mosquitoes. Fortunately, due to our relatively unfriendly habitat, only 50 of the world's 3,000 mosquito species call Wyoming home, where West Nile virus is the disease of concern.

The Asian tiger mosquito (*Aedes albopictus*) and the yellow fever mosquito (*Aedes aegypti*) are responsible for carrying dengue, yellow fever, chikungunya, and Zika viruses. Malaria is spread by certain species of the *Anopheles* mosquito, which are widespread throughout the world.

Substantial attention was given to the Zika virus outbreak in 2016. Zika was first found in monkeys in 1947 and mutated to affect humans with the first case documented in 1952. Even though the mosquito species known to transmit Zika virus are not found in Wyoming at this time, travelers should be cautious. Travel to areas where the vector species are present, such as the southeast U.S. seen in maps to the right, is a concern. Since humans can also transmit the Zika virus, the range of infection is much larger than West Nile virus.

