Prevention and Control for Zika Virus Disease (ZVD)

Technical Bulletin

This document provides general guidance for the prevention and control of Zika virus disease (ZVD). Protective apparel is only one component of a comprehensive personal protective equipment (PPE) program that comes into play when applying insecticides to control the *Aedes* mosquitoes that are known to spread the Zika virus.

This guidance is based on recommendations of the World Health Organization (WHO) and the U.S. Centers for Disease Control (CDC).

These organizations offer extensive information and resources on the Zika virus outbreak that can be found at:

http://www.cdc.gov/zika/

http://www.who.int/topics/zika/en/

Infected *Aedes* mosquitoes transmit Zika virus, as well as other arboviruses (arthropod-borne viruses) such as dengue, chikungunya and yellow fever. These mosquitoes are found around the world across tropical and sub-tropical regions.

The Zika virus was originally discovered in Africa in the 1950s and has since spread across the globe. In May 2015, an outbreak began in Brazil and has spread to other parts of South and Central America, Mexico and the Caribbean, including Puerto Rico. According to CDC tracking as of February 24, 2016, no local mosquito-borne Zika virus disease cases have been reported in the mainland United States, but there have been travel-associated cases.

Among the actions being promoted by the WHO and CDC to reduce the impact of the Zika virus is controlling the *Aedes* mosquito population. This involves a two-pronged approach that combines preventing the propagation of these mosquitoes by:

- **Removing or Treating Breeding Environments.** *Aedes* mosquitoes lay their eggs in almost any standing water source: bird baths, discarded tires, empty cans, etc. Ongoing source reduction of these breeding sites is a key preventive measure. For larger water-holding containers that can't be removed, covered or emptied, treatment with a long-lasting larvicide pesticide is necessary.
- **Applying Pesticides to Kill Adult Mosquitoes.** Once the mosquito season has begun and the presence of Zika or other arbovirus-infected mosquitoes has been detected, area treatment with adulticide pesticides is required.

Consequently, the use of larvicide and adulticide pesticides is a key aspect of Zika prevention. The application of pesticides typically involves the need for protective clothing and protective equipment.

The regulation and use of pesticides in the United States is under the jurisdiction of the Environmental Protection Agency (EPA). The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requires all pesticides sold or distributed in the United States (including imported pesticides) to be registered by the EPA. This includes approval of the use of specific pesticide products for specific applications. For example, Permethrin is a registered synthetic

pyrethroid insecticide commonly used to control adult mosquitoes. Similarly, Temephos is a registered organophosphate insecticide used to control mosquito larvae.

Another aspect of pesticide regulation includes specifying what PPE is required to protect the individuals applying these potentially hazardous chemicals. These requirements are stated in the label instructions that come with the pesticide container, as well as the associated Safety Data Sheet (SDS).

PPE

The requirements for pesticide labels are found in the Code of Federal Regulations (40 CFR Part 156). All persons applying pesticides should refer to the label instructions and related SDS for guidance on the requirements for PPE:

- Gloves (waterproof or chemical-resistant)
- Garments (chemical-resistant)
- Eye protection (goggles or face shield)
- Respirator
- Other PPE

Please note: Protective apparel is only one component of a comprehensive PPE program recommended for pesticide applications.

For additional EPA guidance on PPE for pesticide applications, refer to the related technical reference on the EPA website: Chemical-Resistant PPE for Pesticides

Questions and Answers

1. What is Zika virus disease (ZVD)?

Zika virus is the cause of a relatively mild disease characterized by nonspecific symptoms such as mild fever, skin rashes, conjunctivitis, muscle and joint pain, malaise or headache that normally last for 2 to 7 days. The majority of infected individuals never show any signs or symptoms of infection.

Although not conclusively proven, Zika infection also has been potentially linked with more serious conditions, including microcephaly in infants born to infected mothers and Guillain-Barré syndrome, a rare neurological disorder characterized by muscle weakness and, sometimes, paralysis. There are ongoing investigations and research to determine whether causal links actually exist.

2. How is Zika transmitted?

Aedes mosquito

The virus is spread through bites from infected *Aedes* mosquitoes, the same mosquitoes that spread dengue, chikungunya and yellow fever. Mosquitoes can become infected when they bite a person infected with the virus.

The virus is detectable in blood, urine, saliva and seminal fluid, depending on the phase of the infection. A limited number of cases of transmission have been reported associated with childbirth, blood transfusion and sexual contact.

3. How can I protect myself from becoming infected by the Zika virus?

According to both the WHO and CDC, the best way to prevent diseases spread by mosquitoes is to protect yourself against mosquito bites. Avoiding areas known to have an ongoing infection outbreak will eliminate the risk of contracting Zika or the other mosquito-borne diseases. If this is not possible, you can reduce the risk of being bitten by limiting the amount of time spent outdoors, wearing long-sleeved shirts and long pants, and using EPA-registered insect repellents.

4. Can DuPont recommend PPE to use for the application of pesticides?

The selection of appropriate PPE (including respiratory, eye, head, foot and hand protection) is the responsibility of the end-user and must be made following a thorough hazard assessment of the work tasks and the environment. It also must be checked that the selected PPE meets relevant government and industry standards and that individuals are properly trained in the donning, doffing, use and disposal of PPE to avoid contamination.

The use and application of pesticides is regulated by the EPA. There are a large number of registered pesticide products based on chemical or biological active ingredients in combination with inert ingredients that can come in a variety of forms; most typically, dry powders or granules, solutions, suspensions or emulsions. Water is typically used for liquid formulations, but other liquids such as mineral oil, kerosene, diesel fuel and xylene are sometimes used as carriers.

The PPE that is required to protect individuals applying pesticides will be stated in the label instructions for the product. Requirements also may be found in the SDS for the pesticide.

Often there is the requirement for chemical-resistant clothing or other PPE. A material's chemical resistance depends on chemicals involved (active and inert ingredients), their physical state (liquid or dry), the exposure time, the method of application and the exposure conditions. Consequently, a hazard assessment is needed so that the end-user can select the proper PPE to ensure that individuals are protected when handling pesticides.

The information provided by DuPont is not intended as a substitute for any hazard assessment testing that the end-user needs to conduct to determine the suitability of our products for their particular purposes. This information is offered for consideration and is not a recommendation.

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3) If fabric becomes torn, scratched or punctured, or if a garment closure or seam fails, user should immediately discontinue use of garment to avoid serious injury, including potentially deadly chemical exposure(s). Seams and closures may provide less protection than fabric.
4) Serged and/or bound seams are degraded by some hazardous liquid chemicals, such as strong acids, and should not be worn when these chemicals are present.

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