ISDS 2012 Conference Abstracts

Enhancing Surveillance for Arboviral Infections in the Arizona Border Region

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Objective

To enhance arboviral surveillance and laboratory capacity to establish a surveillance baseline for the emerging threat of Dengue fever in the Arizona-Mexico border region.

Introduction

West Nile Virus (WNV) and dengue virus (DENV) are both arboviruses which are transmitted to humans by an infected mosquito bite during blood-meal feeding. The clinical presentations of non-neuroinvasive WNV and dengue fever are similar, and symptoms may include acute onset of high fever, headache, myalgia, arthralgia, nausea, vomiting, and often a maculopapular rash. More serious manifestations of these viruses include fatal encephalitis and meningitis in WNV patients and fatal hemorrhagic disease in dengue patients. Over the last decade, WNV has spread rapidly across North America, reaching Arizona in 2004, and has become a significant cause of human illness since that time. Even though dengue has been described as primarily a disease of the tropics and sub-tropical areas, there is a small but significant risk for dengue outbreaks in the continental United States as evidenced by surveillance efforts in Texas that identified local dengue transmission in 2005. In recent years, outbreaks of dengue have occurred in Mexico border states, most notably Sonora in 2010. That same year, Arizona had the highest incidence of WNV cases in the U.S. including number of neuroinvasive disease cases, total cases, and number of deaths per state. The emergence of DENV and WNV as important public health problems maybe have been due to non-effective mosquito control, global demographic changes (urbanization and population growth), increased air travel, and inadequate surveillance.

Methods

Vector mapping: Mapping techniques will be utilized to visually depict *Aedes aegypti* populations captured from previous seasonal public health environmental vector trapping programs.

Laboratory capacity: Multi-state laboratory training by CDC Dengue Branch was held in October 2012.

Surveillance: The WNV cases that present to medical services for WNV testing and reported to public health officials are the most severe nueroinvasive cases. Much less is understood about the non-neuroinvasive cases with often present with non-descript symptoms.

Results

Vector mapping: Comparative densities of *Ae. aegypti* with academic partners of the Entomology and Public Health conducting a study capturing *Ae. aegypti* may help to enhance environmental programs.

Laboratory Capacity: The laboratory training will cover conventional serological methods as well as recently FDA cleared molecular RT-PCR. Participants will include public health laboratory personnel working in molecular and serology diagnostics and other binational partners.

Surveillance: A convenient seroprevalence study at sentinel-hospital site of symptomatic patients presenting in Arizona border hospital sites will be performed to better understand circulating levels of arboviral infections.

Conclusions

Appropriate and timely response to surveillance data is the key to identification human and animal disease associated with WNV, DENV, and other arboviruses. The mosquito vector *Ae. aegypti* is well established widespread and thriving in Arizona yet there is no autochthonous transmission of DENV identified to date. The results from this study will identify gaps and potential prevention and control measures for emerging infectious diseases including WNV and DENV in Arizona.

Keywords

Dengue; Surveillance; Emerging infections; Dengue fever; Arboviral

Acknowledgments

US-Mexico Border States, Local Health Departments, Sonora Secretariat de Salud, Arizona State Public Health Laboratory.

References

Hayden, M.H., et al., Microclimate and human factors in the divergent ecology of Aedes aegypti along the Arizona, U.S./Sonora, MX border. Ecohealth, 2010. 7(1): p. 64-77.

Walker, K.R., et al., Human and environmental factors affecting Aedes aegypti distribution in an arid urban environment. J Am Mosq Control Assoc, 2011. 27(2): p. 135-41.

Hoeck, P.A., et al., Population and parity levels of Aedes aegypti collected in Tucson. J Vector Ecol, 2003. 28(1): p. 65-73.

Botz, J.T., Survey of Aedes aegypti eggs in and around homes in Tucson, Arizona. J Am Mosq Control Assoc, 2002. 18(1): p. 63-4.

Fink, T.M., et al., Aedes aegypti in Tucson, Arizona. Emerg Infect Dis, 1998. 4(4): p. 703-4.

Engelthaler, D.M., et al., The reemergence of Aedes aegypti in Arizona. Emerg Infect Dis, 1997. 3(2): p. 241-2.

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