

Dengue Fever Seroprevalence and Risk Factors, Texas–Mexico Border, 2004

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[Dan Rutz] I'm Dan Rutz, speaking today with Dr. Joan Marie Brunkard, an Epidemic Intelligence Service Officer for CDC. We're here to talk about an article in the October 2007 issue of *Emerging Infectious Diseases* about the risk for dengue fever along the border between Mexico and the state of Texas. This report was published in conjunction with the 2007 Global Theme Issue on Poverty and Human Development, an international collaboration of 235 publications sponsored by the Council of Science Editors and the National Institutes of Health. Joan, just what is dengue fever?

[Joan Brunkard] Dengue fever is a mosquitoborne viral disease that causes an estimated 50 to 100 million infections worldwide each year. The symptoms of dengue are flu-like and include fever, severe headache, nausea, vomiting, and extreme muscle and joint pain, which has earned dengue the nickname "breakbone fever." There are four distinct types of dengue, and infection with one does not protect against the others, so it's possible to have four separate dengue infections in a lifetime.

A more severe form of dengue, called dengue hemorrhagic fever, is characterized by high fever, low blood platelet counts, plasma leakage, and hemorrhagic manifestations. This form kills approximately five percent of people who are infected. However, proper treatment with fluid replacement therapy reduces the case fatality rate to about one percent. While classic dengue fever is rarely fatal, having a prior dengue infection increases the likelihood that a person will develop dengue hemorrhagic fever if they're later infected with a different serotype of dengue.

[Dan Rutz] What was the purpose of your study?

[Joan Brunkard] We wanted to take a closer look at research and reports indicating that socioeconomic and public health factors may determine the extent of transmission of mosquitoborne illnesses such as dengue. We looked at the populations of Brownsville, Texas, and Matamoros, Mexico, two neighboring towns located just across the Rio Grande from each other on the Texas–Mexico border. Our objectives were to determine the population seroprevalance of dengue, which indicates how many people have been infected with dengue fever at some point in the past, and to identify the most important risk factors for regional transmission.

[Dan Rutz] Joan, what did you come up with?

[Joan Brunkard] We found that forty percent of Brownsville residents and seventy eight percent of Matamoros residents showed serologic evidence of past dengue infection, indicating that dengue is endemic, or established, on both sides of the border in this region. In addition, a weekly household income below 100 US dollars significantly

increased the likelihood that a person had a recent or past dengue infection – whether that person lived in Texas or in Mexico. Other risk factors for past dengue infection included having mosquito larval habitat, such as water-holding containers around the house, and not having air conditioning or street drainage.

[Dan Rutz] What are the implications of this study to public health?

[Joan Brunkard] Our results show that dengue fever transmission is occurring on both sides of the Texas-Mexico border in this region and that dengue infections are not being identified by our public health surveillance systems. One reason may be that the circulating strains are causing only mild symptoms, so people are managing their illness by self-medicating with acetaminophen, for example, rather than doctor's visits or hospitalization. This was one of the findings from our survey. We also found that fifty nine percent of Brownsville residents regularly cross the border into Mexico for medical treatment, which almost certainly limits disease reporting on the U.S. side of the border. In addition, doctors in Matamoros reported seeing many patients (both U.S. and Mexican citizens) with suspected dengue, but they lacked sufficient laboratory resources to confirm the diagnosis.

The main public health implication to emerge from this study is that the high past dengue seroprevalence we identified on both sides of the border places this population at greater risk for outbreaks of potentially fatal dengue hemorrhagic fever if a new dengue strain is introduced into this region.

[Dan Rutz] So what can be done to improve dengue surveillance and reporting, and what should people be doing to avoid getting a dengue infection?

[Joan Brunkard] Because dengue infections are clearly not being identified through local surveillance efforts, we recommend working to increase physician awareness about the potential for dengue infections and increasing their access to dengue diagnostic tests, especially on the Mexican side of the border, where a large proportion of both U.S. and Mexican border residents seek their primary medical care.

People can protect themselves against infection by reducing the likelihood of mosquito bites. This can be done by getting rid of standing water around the home, using a mosquito repellent containing DEET when outdoors, and wearing long-sleeved clothing that covers arms and legs while outside, especially during peak biting times, which are daytime hours for the mosquitoes that transmit dengue.

Ultimately, investments in local infrastructure, improvements in household screening, economic assistance for air conditioning, and sustained community education about the critical importance of reducing mosquito larval habitat around the home will be necessary to reduce dengue transmission in this region.

[Dan Rutz] Joan, important news, and we thank you for your comments and appreciate your perspective on these findings.

Our discussion with Dr. Brunkard was prompted by an article on dengue fever along the Texas–Mexico border, published in the October 2007th issue of *Emerging Infectious Diseases*. This article, and others on emerging bacterial and viral diseases, can be read online at www.cdc.gov/eid. Again, that's www.cdc.gov/eid.

You can submit your comments on this interview to eeditor@cdc.gov.

For *Emerging Infectious Diseases*, I'm Dan Rutz.

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