

Vector-borne Infections

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[Tanya Johnson] Hello. I'm Tanya Johnson. With me today is Dr. Ronald Rosenberg, Associate Director for Science at CDC's Division of Vector-borne Diseases in Fort Collins, Colorado, and co-author of a commentary in the May, 2011 issue of CDC's journal, Emerging Infectious Diseases. The paper highlights the role of vector-borne pathogens as prominent contributors to emerging infectious diseases. Welcome, Dr. Rosenberg.

[Ronald Rosenberg] Thanks for having me, Tanya.

[Tanya Johnson] Dr. Rosenberg, tell us what an emerging vector-borne pathogen is?

[Ronald Rosenberg] First, I should explain that a vector is a blood feeding insect or tick that carries a pathogen, and a pathogen is a virus, bacteria, or parasite. The vector can transmit the pathogen between people -- that happens with malaria parasites, which are transmitted by mosquitoes – but it's also common for the vector to transmit pathogens from animals to humans. That's what happens when ticks carry the bacteria that causes Lyme disease from wild mice to people. When we find that a pathogen is being transmitted someplace for the first time, we often say that it is "emerging." Now the pathogen could be something that's new to science but, more frequently, it's newly introduced to the area. For example, West Nile virus was discovered in Uganda in the 1930s but it was only introduced, that is, it "emerged," in the US in 1999.

[Tanya Johnson] How did that happen, anyway?

[Ronald Rosenberg] We don't know how West Nile got here but it sure took off when it did. It turns out that American mosquitoes and American birds are just as susceptible to the virus as those in Africa. Most exotic vector-borne pathogens could potentially occur in the US. Diseases cropping up in unusual places are becoming increasingly common. An infected person or animal or mosquito could travel just about anywhere in the world within 48 hours.

[Tanya Johnson] So, you're saying that the US is also at risk for emerging vector-borne pathogens. Why can't we just stop them after they arrive?

[Ronald Rosenberg] Have you ever tried to swat a mosquito? Really, it's pretty hard to control a vector-borne pathogen. Vaccines exist for very few of them. So we usually need to kill the vector and that can be hard to do. Pesticide resistance of mosquitoes is especially big problem. But even when pesticides work, we need to know enough about the habits of the vector to use the pesticides effectively and safely, and often we just don't have that knowledge. What works best is to keep yourself from being bitten in the first place by using repellents, for example.

[Tanya Johnson] In the commentary, you and Dr. Beard point out that vector-borne pathogens are especially likely to emerge. Why is that?

[Ronald Rosenberg] Well, one important factor, among others, is that sometimes when a pathogen adapts to a new vector species or to a new animal host it increases the chance of transmission to humans. Let me give you an example. There's a virus with a very long name, Chikungunya virus, that caused a huge epidemic in the countries bordering the Indian Ocean during 2007 and 2008. This virus is usually transmitted by one species of mosquito but the virus mutated to be transmitted by a more common mosquito, and as a result many more people became exposed and were infected. Both these mosquitoes, by the way, occur in the US.

[Tanya Johnson] Are you saying that Chikungunya virus could emerge in the US?

[Ronald Rosenberg] Well, it's certainly possible. In 2009 we had the first transmission of the dengue virus in Florida in more than 70 years, and the mosquitoes that transmit dengue are the same ones who would transmit Chikungunya.

[Tanya Johnson] This sounds very sobering. What's being done to prevent it from happening?

[Ronald Rosenberg] A number of scientists are dedicated to finding better, faster ways of detecting and combating emerging pathogens before they become epidemics. At CDC, for example, we're doing innovative work on vector control and disease surveillance, both in the United States and abroad.

[Tanya Johnson] Thank you, Dr. Rosenberg. I've been talking with CDC's Ron Rosenberg about a commentary that appears in the May, 2011 issue of CDC's journal, Emerging Infectious Diseases. You can see the entire article online at www.cdc.gov/eid. If you'd like to comment on this podcast, send an email to eideditor@cdc.gov. That's eideditor – one word - at cdc.gov. I'm Tanya Johnson, for Emerging Infectious Diseases.

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