

Outbreaks of *Rickettsia felis* in Kenya and Senegal, 2010

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[Karen Hunter] Hello, I'm Karen Hunter. With me today is Dr. Chris Paddock, an infectious disease pathologist at the Centers for Disease Control and Prevention. We're talking about two papers in the July 2010 issue of CDC's journal, Emerging Infectious Diseases. The articles look at illnesses caused by *Rickettsia felis* in Kenya and rural Senegal. Welcome, Dr. Paddock.

[Chris Paddock] Thank you for inviting me to speak with you.

[Karen Hunter] Dr. Paddock, what is *Rickettsia felis* is and how does it affect people?

[Chris Paddock] *Rickettsia felis* is a bacterium that is transmitted to humans and animals by several different types of blood-feeding arthropods. These can include fleas and ticks. In the case of *Rickettsia felis*, primarily it's a very common flea species found on dogs and cats, known as the cat flea. What's interesting about this particular Rickettsial disease is that it's been described on nearly every continent around the world, except for Antarctica. It causes a fairly mild illness, compared to other Rickettsial diseases that most people are familiar with, like Rocky Mountain spotted fever or Epidemic typhus. In the case of *Rickettsia felis* infection, most patients just develop a fever, headache, muscle aches, maybe a rash. There have been no known deaths attributable to *Rickettsia felis* infection. Nonetheless, because it's so broadly distributed, we think that it's probably a very important Rickettsial disease.

[Karen Hunter] These two studies looked at *Rickettsia felis* as a cause of febrile illnesses in patients in Kenya and Senegal. Tell us about the studies.

[Chris Paddock] Well, both were prospective surveillance studies looking at patients who had undifferentiated febrile illnesses, and what they first did in each study was to eliminate malaria as a possible cause of the diseases, which, cause malaria is very, very common in Africa. Once they did this, they used very sensitive and very specific molecular tests to look for Rickettsial diseases and surprisingly, in both of these studies, they found that *Rickettsia felis* was a fairly common cause of febrile illness. And in both cases, it was anywhere from four to six percent of the persons that they looked at over the intervals for each study. I think in the Senegal study it was nine months, and in the Kenya study it was 23 months. So this is a fairly high incidence for Rickettsial disease. The other surprising thing is that they were looking for multiple causes of Rickettsial disease and, with the exception of one other pathogen found in the Senegal study, all of the causes were attributable to this one agent, *Rickettsia felis*.

[Karen Hunter] In Kenya, all the patients had a history of contact with animals. Knowing this, how can people protect themselves?

[Chris Paddock] Well, that wasn't surprising because all Rickettsial diseases are zoonoses, which are diseases of animals that are transmissible to humans. And in the case of *Rickettsia felis*, the way that they're transmitted to humans is by the cat flea, and the cat flea is associated often with companion animals and pets, like dogs and cats, and these animals are much more likely to be in

close association with humans as opposed to wild animals. So, really, in order to diminish the number of cases of these infections you want to treat the animals for their ectoparasites, in this case for fleas. This is probably much more achievable in the United States, in an affluent country, than it would be in places like Kenya or Senegal.

[Karen Hunter] The Senegal study concluded that children have a significantly higher rate of developing fever from *Rickettsia felis* than older people. Why is that and what are the implications of this finding?

[Chris Paddock] Well that was a very interesting finding, and there could be several reasons responsible for that. The first is that younger children are often in closer association with these companion animals than older patients. The other possibility is that people develop immunity to *Rickettsia felis* infection after repeated exposures to the bacterium. I think the caveat here is that this is one small study, you're looking at, I believe it was about 163 patients in the Senegal study. So, these are the results of a single study and they're very compelling, although I think we need to have more studies to determine whether or not this is something that really applies generally to this disease. Also, remember that in the study in Kenya they did not see this age stratification. But it's certainly something that requires further study.

[Karen Hunter] What is the effect of Rickettsial diseases in the United States and are there lessons in these two studies that we can apply here?

[Chris Paddock] I think the biggest lesson from these two studies is that *Rickettsia felis* is probably significantly under diagnosed both in Africa and probably in many other countries around the world, including the United States. The disease itself seems to be a relatively mild illness, but I think it could be confused for other Rickettsial diseases in the U.S., such as Rocky Mountain spotted fever and probably incorrectly diagnosed as Rocky Mountain spotted fever in several cases because most of the diagnostic tests that are used for these infections currently are relatively nonspecific. They're serologic assays and they don't really tell you which organism is the actual cause of the disease. These two studies emphasize the need for very specific molecular tests, namely PCR testing, and I think that's really the way of the future for all diagnostic scenarios for Rickettsial diseases because without making an appropriate diagnosis or a correct diagnosis you really can't study the epidemiology of these infections as correctly as we would like to think that we have.

[Karen Hunter] Dr. Paddock, what are the symptoms of Rickettsial diseases and when should somebody seek medical attention?

[Chris Paddock] Well there are about 15 to 20 different *Rickettsia* species that could cause Rickettsial illness. And unfortunately, all of them have very similar signs and symptoms early during the illness, which generally are fever, muscle aches, headache, and often a rash. What's important is to recognize that you've had an exposure to a flea or a tick or a mite that might have transmitted one of these infections because, in the case of some of the other diseases we're talking about, like Rocky Mountain spotted fever, the infection can progress very quickly and can potentially kill the patient. In the case of *Rickettsia felis*, the patients may be ill for one to two weeks and feel terrible, but we don't know of any deaths attributable to this infection.

Nonetheless, you really want to be able to treat any suspected Rickettsial disease as early as possible and the drug of choice is doxycycline; it's effective for treating any Rickettsial disease.

[Karen Hunter] Thanks, Dr. Paddock. I've been talking with CDC's Dr. Chris Paddock about two papers that appear in the July 2010 issue of CDC's journal, Emerging Infectious Diseases. You can see both articles online at www.cdc.gov/eid. If you'd like to comment on this podcast, send an email to eideditor@cdc.gov. I'm Karen Hunter, for Emerging Infectious Diseases.

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