

Investigation of Sylvatic Typhus at a Wilderness Camp

[Announcer] This podcast is presented by the Centers for Disease Control and Prevention. CDC – safer, healthier people.

[Ted Pistorius] Hello. I'm Ted Pistorius and I'm here with Dr. Greg Dasch, the Rickettsial Team Leader in CDC's Rickettsial Zoonoses Branch. Today, we're talking about a paper that appears in the July 2009 issue of CDC's journal, *Emerging Infectious Diseases*. The article describes a cluster of cases of sylvatic typhus which occurred at a wilderness camp in southwestern Pennsylvania between 2004 and 2006.

Dr. Dasch, this sounds like a really interesting investigation. Why don't you start by telling us a little about the background for this joint study by the CDC and the Pennsylvania Department of Health?

[Greg Dasch] Ted, we were quite sure that the initial case detected in our laboratory was sylvatic typhus. This was because of the location of the case, the time of year, and the specific type of antibodies detected in this person, and the clinical presentation. Our branch had just published two papers on this subject in 2003 and 2004 as well as earlier reviews on this subject. However, most sylvatic typhus cases are sporadic and isolated, although a few situations where several individuals in a household have experienced sylvatic typhus. We were very concerned that this had occurred in a site with many children and counselors and wanted to ensure that no more cases would occur. However, any good investigation starts with a medical investigation to see if other cases had occurred there previously. The ill individual recalled a previous similar case at this site and the Pennsylvania Department of Health confirmed it in their records. After that, it was a matter of finding out what exposures these two individuals had in common. To our surprise, two other individuals also had slept in the same bed, had been ill, and had antibodies to *Rickettsia prowazekii*. So our concern about taking preventative measures was right on the money.

[Ted Pistorius] Sylvatic typhus is very uncommon in the United States, isn't it? How did the counselors get it?

[Greg Dasch] It is relatively uncommon; in fact only 41 cases of sylvatic typhus have been well documented in the United States since its discovery in 1975. Only two other cases had been described in Pennsylvania in the 25-year period between 1976 and 2001. However, we suspect that cases of sylvatic typhus are frequently missed in the eastern United States, much as two of the four cases described in this article were initially missed because they did not seek medical attention. Our investigation confirmed that flying squirrels had free access to a number of cabins at this site and, most importantly, that all four individuals had slept right beside a nesting site in the wall which contained flying squirrels. Since the wall was not fully sealed, the squirrels could enter the cabin from the nest and debris from their nest could fall on the beds where the counselors slept. From an epidemiology standpoint, it was very important that none of the other individuals sleeping in the cabin had been infected, even counselors sleeping in a bed just a yard away from the bed where exposure occurred. The rest of the investigation merely confirmed that

the flying squirrels were common at the camp, that they all had fleas, and that the squirrels had evidence of infection with *Rickettsia prowazekii*.

[Ted Pestorius] What has this cluster of cases taught us? And specifically, what should people know who are visiting or living in areas of the United States where there are flying squirrels and how can they stay safe while they're there?

[Greg Dasch] The most important finding is that intimate contact with actively occupied flying squirrel nests and their ectoparasites is probably required for transmission. Squirrels present in the nearby habitat or even running through the cabins pose little risk. Consequently, effective barrier exclusion of squirrels from human habitations can probably prevent most cases of sylvatic typhus. This means that all external holes in siding, doors, attics or flooring or ceiling joists need to be closed with heavy gauge screen. Simple removal of flying squirrels without use of insecticides to kill their ectoparasites is a bad idea as the ectoparasites may then seek a human host. However, people are known to keep squirrels as pets and this can pose a risk of infection. Others who may come into contact with squirrel nests during pursuit of their occupations or hobbies, such as bird lovers, construction workers, arborists, or conservationists who may have contact with woodpecker holes or squirrel nests in trees or other sites should also take precautions to minimize exposure to the nesting materials which may have ectoparasites or infected ectoparasite feces.

[Ted Pestorius] So where can this disease occur?

[Greg Dasch] Nearly all cases of sylvatic typhus have occurred in areas within the distribution of the southern flying squirrel, *Glaucomys volans*, including Massachusetts, across New York, Pennsylvania, Ohio, Indiana, all the way to Wisconsin, throughout the Mid-Atlantic States, down to Florida, and west to eastern Texas and Arkansas. However, the northern flying squirrel, *Glaucomys sabrinus*, is also found in areas that overlap with the southern flying squirrel and its distribution extends across the Northern USA into Canada, and has pockets in the western United States, including California, where one case of sylvatic typhus has been documented. We do not know if one race or species of flying squirrels is more likely to be infected with *Rickettsia prowazekii*, although it's clear that the southern flying squirrel is heavily infected. Since we don't know this information, the best advice is to avoid contact with them altogether. Indeed, because they are a nocturnal species and fly from one nesting site to another, many people are not even aware they are there. Our listeners should not assume that these squirrels are only found in wilderness camps in the Appalachian Mountains. The squirrels can reside in many habitats with trees and good nesting holes but often seek warmer homes in buildings during the cold winter months and this is when transmission of sylvatic typhus occurs most frequently.

[Ted Pestorius] So what are the symptoms of sylvatic typhus and when should people seek care?

[Greg Dasch] Anyone who becomes ill with fever, chills, and sweats or has a severe headache or rash accompanying these general symptoms should see a physician. It is very important to report environmental clues like suspected flea bites and exposure to flying squirrels and to ask for appropriate testing of blood samples for rickettsial infections. Rickettsial infections like sylvatic typhus are very treatable but, the later treatment begins, the greater the chance that these illnesses

will cause extended hospitalizations or potentially, even fatal infections or indeed cause persistent long-term effects, even after treatment.

[Ted Pistorius] Well thank you so much for discussing these issues with us, Dr. Dasch.

We've been talking today about a paper that appears in the July 2009 issue of CDC's journal, Emerging Infectious Diseases. You can see the whole article online at www.cdc.gov/eid. And if you'd like to comment on our podcast, send us an email to eideditor@cdc.gov. That's eideditor – one word - at c-d-c dot gov. I'm Ted Pistorius, for Emerging Infectious Diseases. Thank you for listening and have a healthy day.

[Announcer] For the most accurate health information, visit www.cdc.gov or call 1-800-CDC-INFO, 24/7.