



Provider Health & Safety Advisory Tick-Borne Relapsing Fever September 25, 2017

The Austin Public Health Department has reported a number of tick-borne relapsing fever cases (TBRF) associated with local area caves. Since December 2016, at least 6 (six) cases of relapsing fever have been reported among individuals conducting various scientific research with the City of Austin cave system. Evidence suggests that such infections are more common than previously assumed. These caves have included those within the Barton Creek Greenbelt. Previously, there has been no such reports of this disease involving these cave systems.

A review of the NFIRS system has indicated incidents that have resulted in the Austin/Travis County System to access these caves for training and searches for individuals potentially lost within the caves. The purpose of this advisory is to provide information regarding tick-borne relapsing fever and the preventative and after-action measures that rescuers should take when engaged in such cave activities.

Based on conversations with representatives of the Austin Public Health and the Balcones Canyon Land Conservancy, the following information is provided.

Relapsing fever is caused by certain species of *Borrelia*, a gram negative bacteria 0.2 to 0.5 microns in width and 5 to 20 microns in length. These bacteria have a cork-screw shape referred to as a spirochete. There is no specific classic presentation of the tick bite such as seen with Lyme Disease. The bite(s) may present as small red dots approximately 1/8" long with itching.

Tick-borne relapsing fever is characterized by recurring febrile episodes that last approximately 3 days and are separated by afebrile periods of approximately 7 days duration. Along with fever, patients may experience a wide range of nonspecific flu-like symptoms. The first febrile episode occurs within 10 days of the initial tick bite.

The bacteria that cause TBRF are transmitted to humans through the bite of infected "soft ticks" of the genus *Ornithodoros*. Soft ticks differ in two important ways from the more familiar "hard ticks" (e.g., the dog tick and the deer tick). First, the bite of soft ticks is brief, usually lasting less than half an hour. These ticks do not attach to the host. They will feed and quickly drop off. Second, soft ticks do not search for prey in tall grass or brush. Instead, they live at and within rodent burrows and caves, feeding as needed on the rodents, bats, or other dened animals as they sleep. These ticks are quick movers and may be found not only on the floor of the cave, but on the ceiling if bat activity is present.

The activity of these soft ticks appears to be focused south of the Colorado River. The range of identified populations includes Rollingwood to the MoPac / Davis Lane areas.

Additionally, it appears that several cave networks exhaust natural carbon dioxide which makes these caves less inviting to the ticks since the atmospheric CO² makes it difficult to identify a clear blood meal.

Providers are encouraged to be attentive to possible exposure risks when engaged in extensive cave rescue operations.

Providers should consider the following additional steps during cave operations:

- Maintain a heightened awareness to the potential for interface with ticks.
- Be attentive to the exterior rim and ledge of the cave as there can be large populations of ticks at the entrance of the cave to maximize their access to a passing blood meal.
- Consider the use of Tyvek suits. However, infections have occurred even among those who were donned in such suits. Ensure overlap areas are secured and taped.
- Because of the interaction with endangered species, the application of DEET should not be considered. Attempts are being made to identify if other approved natural based insect repellents can be applied onto the Tyvek suit.
- Upon exiting the cave, conduct a thorough and complete tick check to identify and remove any adhering ticks. Consider the use of a brush.
- PPE must be removed slowly and deliberately, in the correct sequence to reduce the possibility of ticks accessing and biting the provider.
- After PPE removal examine the skin for evidence of bites.
- Clean and dress any obvious wounds or bites.
- If possible, conduct a tick check of the patient with particular attention to brushing clothing to remove any present ticks.
- Ensure the hospital or other receiving facility is notified that the patient was extricated from a cave and consideration should be given to the potential for tick bites.
- Be attentive to the development of a fever within 10 days of the incident. Contact your private health care provider and report your recent cave rescue activities so as to be evaluated for potential relapsing fever.
- Report your illness to your chain of command and Workers' Compensation Representative.
- Relapsing fever is treatable with antimicrobial therapy.
- Perform thorough inspection and cleaning of all equipment that had contact with the patient and/or the environment to ensure no insects are able to harbor.

As with many emerging disease conditions, it is vital to maintain a heightened level of concern and awareness when interacting in these cave environments. Adherence with the above recommendations can ensure a healthy conclusion to the event.

Should you have any questions, or need additional information, do not hesitate to contact me.

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