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Introduction

Tickborne illnesses include a range of infections and diseases such as Lyme disease, tularemia, and Rocky Mountain spotted fever. These illnesses can occur when a human is bitten by a tick carrying one or more of the pathogens. This series of Epi News articles aims to bring awareness to tick bite prevention and identify tickborne diseases in human populations.

Geography & Exposure

Exposure to ticks can occur year-round but is most common during the warmer season from April through September. Ticks are generally found in areas that are grassy, brush filled, or wooded. Ticks can also live on animals, including mammals, birds, reptiles, and amphibians; therefore, interacting with wildlife can pose a risk for ticks to come into contact with human populations. Some tick species live on different hosts during various stages of development while other species prefer the same host. Ticks must have blood meals during stages of development in order to survive.

Tick Species & Diseases in Humans

There are several species of ticks in North America. Not all ticks bite and only certain tick species carry diseases. The West Coast and high desert regions are home to several species which can transmit tickborne diseases to humans. Table 1 illustrates tick species found in the western United States and the types of diseases they can carry. This interactive site illustrates the general location of the major species found in the United States.

https://www.cdc.gov/ticks/geographic_distribution.html

Table 1: Tick Species & Diseases Transmitted, Western United States ⁱ	
Tick Species	Diseases Transmitted
American dog tick	Tularemia Rocky Mountain spotted fever
Brown dog tick	Rocky Mountain spotted fever
Rocky Mountain wood tick	Tularemia Rocky Mountain spotted fever Colorado tick fever
Western blacklegged tick	Anaplasmosis Lyme disease

Prevention

Ticks can be present in several types of outdoor settings, therefore, preventing tick bites is the first step in reducing risk of infection.

Treat clothing and outdoor equipment: Products that contain 0.5% permethrin can be used on most fabrics and materials including camping gear such as backpacks, tents, and personal gear such as boots and outerwear. Permethrin based repellent lasts multiple washes, however, must be applied in accordance with the guidance on labels since it is an insecticide.ⁱⁱ

Repel Insects: Insect repellents can be used for skin and other surfaces. The Environmental Protection Agency (EPA)-registered list can be found here <https://www.epa.gov/insect-repellents>.ⁱⁱⁱ Do not use products containing Oil of Lemon Eucalyptus (OLE) or para-menthane-diol (PMD) on children under 3 years. A search function is available to easily identify the appropriate repellent <https://www.epa.gov/insect-repellents/find-repellent-right-you>.

While outdoors: If out backpacking or hiking, try to select well-maintained trails or choose options that avoid walking through heavily wooded areas, tall grass, or thick brush. Stick to the center of walking trails and wear long sleeved shirts, pants, and high boots. Wear light-colored clothing, as ticks will be easier to spot.^{iv}

After coming indoors: After coming indoors, conduct a tick check on the surface of clothes, gear, and skin. Shake off clothes outside and wash on high temperature settings as cold and warm water will not kill ticks. If clothes or other gear do not need to be washed or cannot be washed, they can be placed in a dryer on high heat for 10 minutes to kill ticks. Shower soon after being outdoors as this can help with a tick check and washes off any unattached ticks. Research has demonstrated showering within two hours of coming indoors reduces risk of getting Lyme disease and may be effective in reducing risks for other tickborne diseases.^v

Pets: If you own an animal, such as a dog or cat that goes outside, check animals after they come inside in order to spot and remove ticks. Finding ticks on pets may be difficult, especially for longer haired animals and those pets that transition from outside to inside several times a day. There are products that can be used on dogs to prevent ticks, however cats are much more sensitive to several chemicals, so please consult with a veterinarian prior to purchasing and using tick prevention products on animals.

Around the house: Environmental prevention can be done around the house in order to reduce tick populations. This includes removal of leaf litter and trimming and cutting tall grass and brush around the home. Place a 3-foot wide barrier of wood chips or gravel landscaping between lawns and wooded areas. Stack wood in dry areas and move decks and patios to areas away from yard edges and trees. Discourage deer, raccoon, rabbits, and other wildlife from entering your yard.

Biting & Removal

Once a tick finds a host, it may take 10 minutes to two hours to prepare to feed. Ticks will then make a cut and insert its feeding tube. The feeding tube can have barbs which keep it in place, some species also secrete a cement-like substance to prevent from becoming detached. The saliva of ticks contains anesthetic properties, so the host cannot feel if a tick is attached. Ticks may feed for several days and transmission of disease is possible during this time.

If you find that a tick has attached itself to the skin of a human or a pet, there is no need to panic. The most important thing is to remove the tick as soon as possible. There are several tick-removal devices available, however, a set of fine-tipped tweezers works just as well.^{vi}

Steps for Removal

1. **Never crush a tick with your fingers.** Use tweezers or another device designed for tick removal to grasp the tick as close to the surface of the skin as possible.
2. Pull upward with steady, even pressure. **Do not twist or jerk the tick as this may cause parts of the mouth to break off and remain lodged**

ⁱ The Centers for Disease Control and Prevention. Regions where ticks live. Accessed April 2021 https://www.cdc.gov/ticks/geographic_distribution.html

ⁱⁱ United States Environmental Protection Agency. Repellent-treated clothing. Accessed April 2021 <https://www.epa.gov/insect-repellents/repellent-treated-clothing>

ⁱⁱⁱ United States Environmental Protection Agency. Repellents: Protection against Mosquitoes, Ticks and Other Arthropods. Accessed April 2021 <https://www.epa.gov/insect-repellents>

- in the skin.** If this happens, try to remove the mouth parts with the tweezers.
3. Once the tick is removed, **wash the bite mark thoroughly** with rubbing alcohol or soap and water.
 4. **Dispose of the tick** by flushing it down the toilet, place it in alcohol, or in a sealed bag or other container and throw it away.

Symptoms After Being Bitten

A person may not exhibit any signs of a tick bite, while others may see a small red bump appear within a few days to a week. Symptoms include fevers and chills as well as headache, fatigue, and muscle aches. Joint pain is also experienced among those who are infected with Lyme disease. Lyme disease, Rocky Mountain spotted fever and tularemia all result in distinctive rashes, and associated physiological symptoms, which will be described in later Epi News releases of this tickborne disease series.

If any of the above symptoms are experienced after exposure to ticks, it is important to be evaluated by a provider and to recall activity in the outdoors or interactions with pets or wildlife that may have resulted in exposure. Providers may run a series of diagnostic tests to determine infection of tickborne diseases. Testing and treatment will also be described in later releases of this tickborne disease series.

Reporting

The list of reportable communicable diseases and reporting forms can be found at <http://tinyurl.com/WashoeDiseaseReporting>

Report all tickborne diseases to the Washoe County Health District. To report a communicable disease, please call 775-328-2447 or fax your report to the WCHD at 775-328-3764.

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^{iv} United State environmental Protection Agency. Tips to Prevent Tick Bites. Accessed April 2021 <https://www.epa.gov/insect-repellents/tips-prevent-tick-bites>

^v The Centers for Disease Control and Prevention. Preventing tick bites. Accessed April 2021 https://www.cdc.gov/ticks/avoid/on_people.html

^{vi} The Centers for Disease Control and Prevention. Tick Removal. Accessed April 2021 https://www.cdc.gov/ticks/removing_a_tick.html