

## Field Safety Guide: Tick Exposure Prevention and Response

### Overview of Hazards

#### Introduction to Tick Hazards

The purpose of this guide is to establish rigorous biological hazard safety protocols for all personnel engaged in outdoor field operations. This guide is designed to mitigate the risk of tick-borne illnesses through identification, proactive controls, and standardized medical response.

#### Biological Overview

Ticks are parasitic arachnids (eight-legged in nymph and adult stages) related to mites and spiders. Field workers must be able to identify ticks based on their life stage and feeding status:


- Nymphs: Approximately the size of a poppy seed.
- Adults: Approximately the size of a sesame seed.
- Unfed Status: Typically small, flat, and dark brown or black.
- Engorged Status: Upon feeding on blood, the body expands to the size of a raisin and changes color to a gray or light-tan hue.






#### Seasonal Activity and Environmental Warnings




While peak activity occurs between April and September (spring and early summer), exposure is a year-round threat. Important: Cold weather does not eliminate the risk of exposure. Deer ticks (Blacklegged ticks) remain active throughout the year, even in sub-freezing temperatures and areas with snow or ice cover.

#### Identification Quick Guide

Personnel should be familiar with the following species. More information can be found at the source noted below this guide.

Tick Name	Image
American Dog Tick	 <p>The image shows four American Dog Ticks at different life stages. From top-left to bottom-right: a small Larva, a slightly larger Nymph, a large Adult Male with a mottled pattern, and a large Adult Female with a distinct yellowish-white patch on its back.</p>

Blacklegged (Deer) Tick	 <p>Larva</p> <p>Nymph</p> <p>Adult Male</p> <p>Adult Female</p>
Brown Dog Tick	 <p>Larva</p> <p>Nymph</p> <p>Adult Male</p> <p>Adult Female</p>
Western-Black Legged Tick	 <p>Larva</p> <p>Nymph</p> <p>Adult Male</p> <p>Adult Female</p>
Gulf Coast Tick	 <p>Larva</p> <p>Nymph</p> <p>Adult Male</p> <p>Adult Female</p>
Lone Star Tick	 <p>Larva</p> <p>Nymph</p> <p>Adult Male</p> <p>Adult Female</p>

<p>Rocky Mountain Wood Tick</p>	 <p>Larva</p> <p>Nymph</p> <p>Adult Male</p> <p>Adult Female</p>
<p>Pacific Coast Tick</p>	 <p>Adult Male</p> <p>Adult Female</p>
<p>Cayenne Tick</p>	 <p>Larva</p> <p>Nymph</p> <p>Adult Male</p> <p>Adult Female</p>

Source: <https://web.uri.edu/tickencounter/fieldguide/ticks-by-species/>

### Key Identification Features

Initial identification focuses on size and engorgement level. Small, dark ticks are often recently attached; gray, raisin-sized ticks indicate prolonged attachment, increasing the risk of pathogen transmission.

## Site Risk Assessment Framework

### Environmental Risk Matrix

Prior to the commencement of field work, the supervisor must evaluate the work site using the following matrix.

Risk Level	Environmental Indicators	Regional/Seasonal Factors
<b>Low</b>	Paved areas; parking lots; well-manicured lawns; no work within 10 feet of unmanaged vegetation.	Regions with no tick populations. Outdoor work in regions with no tick populations; sub-freezing temperatures, snow or ice cover on ground.*
<b>Medium</b>	Brush-hogged fields; wetlands/grasslands; forested areas with little undergrowth; weeds < knee height; moderately dense foliage; sporadic or moderately vegetated shaded areas; average leaf accumulation and decaying material on the ground; work taking place in fields after application of insecticide.	Regions with moderate tick populations; outdoor work during spring, summer and fall months.*
<b>High</b>	Uncut fields, wetlands, forested areas, and grasslands; weeds taller than knee height; heavy dense foliage; heavily vegetated shaded areas; excessive accumulations of leaves and decaying material on the ground.	Regions with heavy populations; posted hazard warnings; outdoor work during spring, summer, and fall activity.*

\*Note: Cold weather does not eliminate risk of exposure to deer ticks as they may be active all year in areas that experience subfreezing temperatures.

### Habitat Awareness

Avoid high-probability habitats whenever practical. These include:

- Tall grasses and overgrown, bushy vegetation.
- Wooded or heavily shaded environments.
- Areas near water sources and riparian zones.
- Locations frequented by hosts (mice, rats, and deer).

## Prevention and Exposure Controls

### Engineering and Administrative Controls

A hierarchy of controls is important for all outdoor projects:

- **Engineering Controls:** Direct the mowing of work areas and the clearing of overgrown vegetation to eliminate tick habitats prior to personnel entry.
- **Administrative Controls:**
  - **Daily Safety Briefings:** Biological hazards should be addressed prior to the start of work each day. For low-risk situations, the discussion should include potential exposure to weeds and vegetation near fences, buildings, and trees.
  - **Scheduled Tick Checks:** Conduct complete body checks every morning and evening. Additional checks should be performed periodically throughout the workday.
  - **High-Priority Search Areas:** Ticks prefer warm areas with thin skin. Focus inspections on the hairline, behind the knees, inside the armpits, and the groin.
  - **Housekeeping:** Maintain clean vehicle cabs and equipment storage areas to prevent "hitchhiking" ticks from establishing an indoor hazard.

### Personal Protective Equipment (PPE)

The following attire is warranted for all field personnel to eliminate entry points:

- **Clothing:** Command light-colored, long-sleeved shirts and long pants made of tightly woven fabric.
- **Headwear:** Requirement: Light-colored hat or hardhat must be worn.
- **Securing Gear:**
  - Shirts should be tucked into pants at all times.
  - Pant legs should be tucked into boots or socks.
  - Use taped cuffs/pant legs, tick gators, or double-sided duct tape (sticky side out) to create an impassable barrier.
- **Specialized Gear:** In high-risk environments, utilize white Tyvek coveralls and insect mesh/netting for the face and head. Note: Please keep in mind the risk of heat stress and added layers of PPE. Consider conducting field work during cooler parts of the day, if additional PPE layers are needed.
- **Repellents and Chemical Barriers**
  - **Skin Application:** Use EPA-registered repellents (DEET 20-40%, Picaridin, IR3535, Oil of Lemon Eucalyptus, PMD, or 2-undecanone).
  - **Clothing Treatment:** Treat boots, backpacks, and outerwear with 0.5% Permethrin. This treatment is highly recommended if skin-applied repellents are not used.

## Tick Removal Protocols

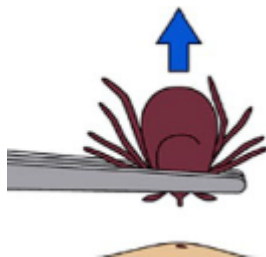
### Immediate Action Steps

If a tick is found attached, it must be removed immediately. Do not use heat, petroleum jelly, or chemicals. Follow these bolded steps precisely:

#### Method A: Fine-Tipped Tweezers

1. Use point-tip/fine-tipped tweezers to reduce the potential of crushing the tick's body.
2. Grasp the tick as close to the skin as possible (at the mouthparts).

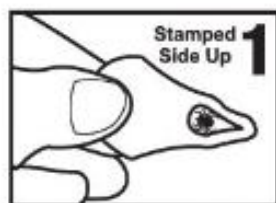
3. Pull upward with steady, even pressure. Pull straight out.
4. **Do not** twist, jerk, wiggle, or crush the tick, as this may break the body off from the mouthparts.



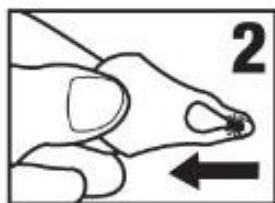
## Method B: Tick Removal Tool (Tick Key)

1. Place the Tick Key over the tick in the tear-drop hole, ensuring the **stamped side is facing up**.
2. Slide the Tick Key flush against the skin to entrap the tick in the tapered slot.
3. Continue pulling quickly in the same direction without lifting the tool from the skin.

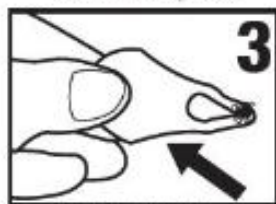
### 3 Easy Steps To Complete Tick Removal



Place the Key over the tick in the tear-drop hole.



Slide Tick Key flush against the skin to entrap tick in tapered slot.



Do NOT Lift Tick Key. Continue pulling quickly in the same direction for proper removal.

- Early and proper tick removal is known to help prevent tick-borne diseases.
- Tick Key is made of durable, high-strength anodized aluminum. Disinfect with alcohol after each use. Thoroughly wash bite area and hands.

**Use as directed. For tick removal only.**

Source: <https://tickkey.com/how-it-works/>

## Post-Removal Sanitization and Disposal

- **Sanitization:** Immediately wash the bite area and your hands with soap and water (primary) or rubbing alcohol/iodine.
- **Tool Care:** If a removal tool was used, it must be disinfected with alcohol after use.
- **Disposal/Retention:** Dispose of the tick by flushing it. If work was in a high-prevalence area, preserve the tick in a sealed plastic bag with a moist cotton ball for medical identification.

## Medical Monitoring and Response

### Documentation

Record the date and time of removal. Personnel should document the specific geographical location where the exposure likely occurred to assist healthcare providers in regional disease diagnosis.

### Symptom Checklist

Contact your licensed healthcare provider or a local licensed healthcare provider immediately if any of the following occur:

- A rash (specifically around the bite site or a "bullseye").
- Fever, chills, or headache.
- Unusual fatigue or muscle pain.
- Joint swelling and pain.

### Infection Transmission Windows

Pathogen transmission is time-dependent:

- **Lyme Disease:** Typically requires a minimum of 36 hours of attachment.
- **Rapid-Transmission Infections:** Infections such as Anaplasmosis, Ehrlichiosis, Babesiosis, and Rocky Mountain Spotted Fever can be transmitted in as little as 15 minutes.

## Post-Field Decontamination

### Personal Hygiene

Shower within two hours of returning from the field. This is a high-priority control to wash off unattached ticks and perform a secondary body inspection of warm, soft-skin areas.

### Gear and Equipment Decontamination

Inspect all backpacks, equipment cases, and pets before entering a home, lab, or office.

## Contact Information

For questions regarding this guidance, contact EH&S at (510) 642-3073, [ehs@berkeley.edu](mailto:ehs@berkeley.edu).

## References

- [UC Davis Health - Tick bite? What you should do to reduce your chances of getting sick](#)
- [The University of Rhode Island Field Guide to Ticks](#)
- [US Center for Disease Control and Prevention](#)
- [Tick bite tool](#)