**Tick Removal**

**Step 1:** Use pointy tweezers.

**Step 2:** Disinfect the tick-bite area with rubbing alcohol.

**Step 3:** Place your tweezers as close to the skin as possible. With pointy tweezers you should be able to grab the tick’s head or directly above the head.

**Step 4:** Once you’ve grabbed the tick firmly between your pointy tweezers, apply a slow, steady, upwards pull in order to avoid breaking the tick.

**Step 5:** Disinfect the area with rubbing alcohol again.

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**Preventing Tick-Borne Disease**

1. **Dress Appropriately**
   - Wear light-colored clothing so that ticks are easier to see and remove.
   - Tuck pant legs into socks and tuck shirt into pants.

2. **Perform Frequent Tick Checks**
   - Check yourself, your children and your pets for ticks.
   - Check for ticks after all outdoor activities.

3. **Use Tick Repellent**
   - Apply 30% DEET to exposed skin. Pre-treat (or purchase) clothes treated with 0.5% permethrin, an insecticide that kills ticks.
   - Always follow directions on the lab when using repellents and insecticides.
   - Ask your veterinarian about tick control methods for your pets.

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**Using Insect Repellents Safely**

- The EPA currently approves repellents containing any one of the following three ingredients: DEET, picaridin and oil of lemon eucalyptus. DEET and picaridin have been demonstrated to be more effective and provide longer-lasting protection than other products on the market.

- Select a repellent that provides protection for the amount of time that you will be outdoors, and re-apply a product if your outdoor stay is longer than expected.
  - 24% DEET = 5 hours of protection
  - 20% DEET = 4 hours of protection
  - 7% DEET = 2 hours of protection

- Repellents should be applied only to exposed skin and/or clothing (as directed on product label). Do not use under clothing.

- **Never** use repellents over cuts, wounds or irritated skin.

- Do not apply to eyes and mouth; when using sprays, do not spray directly onto face.

- Do not allow children to handle repellents and do not apply repellents to children’s hands.

- Use just enough repellent to cover exposed skin and/or clothing.

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**Protect Your Yard**

- **Perimeter sprays.** Perimeter spray treatments are eco-friendly by limiting the amount of pesticide being applied, and targeting the areas where people most frequently come into contact with ticks. The chemicals used today for tick control are much less toxic than in the past, and are used in very low concentrations.

- **Mouse-targeted devices.** Black-legged ticks become infected with the Lyme disease-causing pathogen when they feed on reservoir animals, primarily white-footed mice. These mice are common and often quite abundant in rural, suburban, and semi-urban settings across much of the eastern United States.

- **Eliminate tick habitat.** Black-legged ticks live where yards border wooded areas, ornamental plantings and gardens, or anywhere it is shaded and there are leaves with high humidity. By raking leaves, trimming shrubs and low branches you can make certain areas where ticks cannot survive. Pay special attention to frequented border areas, woodpiles, stonewalls and sheds.

- **Do not attract wildlife.** Ticks can be brought to your yard by deer and become infected by feeding on mice. Keep deer out by planting undesirable plants, installing deer fencing or applying deer repellents. Clean up brush, keep stonewalls clear of leaves, move woodpiles away from daily activity. Birdfeeders also attract deer and rodents that may drop ticks off.

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For more information on tick removal, visit Tick Encounter.org

For more information about pre-treating your clothes with permethrin, visit InsectShield.com

For more information regarding tick repellent safety, please visit the Virginia Department of Health website at vdh.state.va.us

For more information about tick-proofing your yard, please visit Tick Encounter.org
**Ticks and Tick-Borne Pathogens of Virginia**

**Lyme Disease**
Lyme disease is an illness caused by *Borrelia burgdorferi*, a corkscrew-shaped bacterial pathogen. This bacterium is transmitted to humans through the bite of an infected black-legged tick. Ticks become infected by feeding on small mammals, such as the white-footed mouse, which are reservoirs for the bacteria. Although these ticks do feed on deer, deer are not reservoirs of the bacteria and do not pass it to ticks.

**Signs and symptoms** in the early stage (3-30 days post tick bite) include a red, expanding rash called erythema migrans (EM), fatigue, chills, fever, headache, muscle and joint aches and swollen lymph nodes. Some people may get these general symptoms in addition to an EM rash, but others, these general symptoms may be the only evidence of infection.

**If untreated**, the infection may spread to other parts of the body. Symptoms of this spread may include additional EM lesions, loss of muscle tone on one or both sides of the face, headaches and neck stiffness and pain and swelling of the large joints.

**After several months**, approximately 60% of patients with untreated infection may have intermittent bouts of arthritis, with severe joint pain and swelling. Large joints are most often affected, particularly the knees. Up to 5% of untreated patients may develop chronic neurological complaints months to years after infection.

**Anaplasmosis**
The symptoms of anaplasmosis can vary, but most patients have a moderately severe fever and exhibit symptoms such as headache, muscle pain and malaise. These symptoms will typically appear after an incubation period of one week after tick exposure. Anaplasmosis can be fatal in some cases if left untreated.

**Babesiosis**
Babesiosis is caused by a protozoan called *Babesia microti*. Most people who are infected do not display any symptoms. Some people develop flu-like symptoms such as fever, chills, sweats, headache, body aches, loss of appetite, nausea or fatigue. The disease can be severe and life-threatening in people who are elderly, have a weak immune system or other serious health condition.

**Ehrlichiosis**
Human ehrlichiosis is a disease caused by at least three different ehrlichial species in the U.S. The symptoms caused by infection usually develop 1-2 weeks after being bitten by an infected tick, and include fever, headache, chills, malaise, muscle pain, nausea and rash. The disease is typically more severe in people with weakened immune systems.

**STARI**
*Borrelia lonestari* is a bacterium that is a possible causative agent for Southern Tick Associated Rash Illness (STARI). STARI is a Lyme-disease like illness that often presents with a bull’s-eye rash (erythema migrans) that is also typically seen in the early stages of Lyme disease. Other symptoms of STARI include fever, fatigue, headache, muscle and joint pain.

**Rocky Mountain spotted fever**
Rocky Mountain spotted fever is caused by *Rickettsia rickettsii*. It can be difficult to diagnose in its early stages. The combination of a fever, rash and history of tick bite is a strong indication, but it is not always easy to detect. People infected with *R. rickettsii* generally develop symptoms five to ten days after a tick bite, and the symptoms are generally severe. Early symptoms of Rocky Mountain spotted fever may resemble a variety of other infectious and non-infectious diseases. These symptoms include nausea, vomiting, muscle pain and lack of appetite; and (as the disease progresses) abdominal pain, joint pain and diarrhea.

**Tidewater spotted fever**
Tidewater spotted fever is a disease caused by the bacterium *Rickettsia parkeri*. The symptoms of Tidewater spotted fever include fever, fatigue, rash and muscle weakness or muscle pain. Symptoms usually occur within 2-10 days after being bitten by an infected tick. Although symptoms are similar to Rocky Mountain spotted fever, instead of a spotted rash patients generally have a cigarette burn-like eschar at the site of tick attachment.

**Did you know?** Old Dominion University is conducting research on ticks and tick-borne diseases in Hampton Roads. For more information about our research, visit our website or like us on Facebook!

ww2.odu.edu/~hgaff/index.shtml  www.facebook.com/oduticklab