

# Community IPM

## Understanding and Managing Ticks – A Guide for Schools, Child Care and Camps

Ticks are tiny, blood-feeding arthropods closely related to spiders and mites. With the ability to feed on a variety of hosts, ticks can be found in many environments—shoreline, forest, farm, field, and playground. At school and child care facilities, they may be found on school yards located in and around wooded areas, paths, and cross-country trails.

Ticks are a public health risk because they feed on the blood of humans and other animals, and can transmit several diseases, including Lyme disease. Awareness and a little precaution can help you steer clear of tick-borne illness and the discomfort of being bitten by ticks.

### Did You Know...?

- **Historic hatred:** To Aristotle, Cato, and Pliny, ticks were “disgusting parasites”.
- **By the numbers:** There are 671 species of hard-bodied ticks and 167 species of soft-bodied ticks worldwide. There are four major species of ticks considered human health concerns in New York.
- **Frost resistant:** As long as the temperature is above freezing, blacklegged ticks can be on the move. Even on those warm January days, be sure to protect yourself from ticks.
- **No jumping, dropping, or flying:** Ticks quest, which means they stand at the tips of grass or ends of branches and wave their front claws in the air, waiting for a host—human or animal—to brush by.
- **Taking their time:** Finding a tick on a child is not proof that the tick came from the school or child care property. Ticks may wait several hours before attaching, and then can take another two hours to insert their mouthparts. There is, however, no established minimum time that it takes to transmit diseases after attachment.
- **Tweezers are best!** Use fine-pointed tweezers to grab the tick as close to the skin as possible and pull straight up until the tick releases. Grab it too high, or using other methods such as matches, nail polish, or petroleum jelly, could irritate the tick, causing it to salivate, increasing the chances of injecting disease-causing pathogens and other substances into the bloodstream.

### Biology

While all ticks feed on blood, different species look different, can be found in different habitats, and pass on different diseases. For each species, different life stages will feed on different hosts, with larvae and nymphs attaching to small animals, such as mice, and adults attaching to larger animals, such as deer.



Questing blacklegged tick. Photo: NYSIPM.

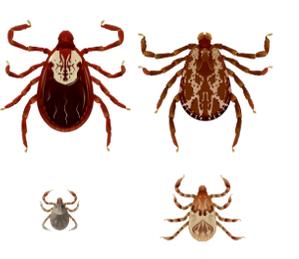
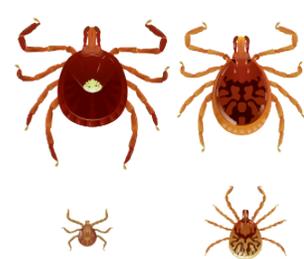
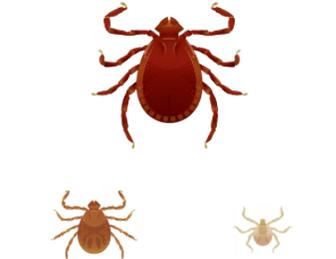


The goal is to avoid any engorged ticks. Photo: Scott Bauer, USDA Agricultural Research Service, Bugwood.org



L to R: larva, nymph, adult male, adult female blacklegged ticks. Photo: CA Dept. of Public Health.

## Biological information about the four major species of ticks considered human health concerns in New York

<a href="#">Click here for long description</a>	<b>Blacklegged (Deer) tick</b> <i>Ixodes scapularis</i>	<b>Dog (Wood) tick</b> <i>Dermacentor variabilis</i>	<b>Lone Star tick</b> <i>Amblyomma americanum</i>	<b>Asian Longhorned tick</b> <i>Haemaphysalis longicornus</i>
<b>Illustrations of species</b>  Illustration of ticks by C. Madden, coburndesign.com, for NYSIPM.				
<b>Habitat</b>	<ul style="list-style-type: none"> <li>• Deciduous forest</li> <li>• Forest-field edge</li> <li>• Overgrown or brushy areas</li> <li>• Can be found in shady lawns</li> </ul>	<ul style="list-style-type: none"> <li>• Grassy fields</li> <li>• Overgrown or bushy areas</li> <li>• Marshy areas</li> <li>• Can be found in lawns</li> </ul>	<ul style="list-style-type: none"> <li>• Woodlands</li> <li>• Grassy fields</li> <li>• Roadsides</li> <li>• Can be found in lawns</li> </ul>	<ul style="list-style-type: none"> <li>• Woods</li> <li>• Grassy fields</li> <li>• Forest-field edge</li> <li>• Can be found in lawns</li> </ul>
<b>Primary Hosts</b>	<ul style="list-style-type: none"> <li>• White-footed mice</li> <li>• Chipmunks</li> <li>• Deer</li> </ul>	<ul style="list-style-type: none"> <li>• Small rodents (larvae and nymphs)</li> <li>• Dogs</li> <li>• Medium to large mammals</li> </ul>	<ul style="list-style-type: none"> <li>• Deer</li> <li>• Turkey</li> <li>• Pets</li> <li>• Livestock</li> </ul>	<ul style="list-style-type: none"> <li>• Deer</li> <li>• Medium sized wildlife</li> <li>• Livestock</li> </ul>
<b>Human Disease Pathogens</b>	<ul style="list-style-type: none"> <li>• Lyme Disease</li> <li>• Anaplasmosis</li> <li>• Babesiosis</li> <li>• Powassan virus</li> <li>• <i>Borrelia miyamotoi</i></li> <li>• Ehrlichiosis</li> </ul>	<ul style="list-style-type: none"> <li>• Rocky Mountain spotted fever</li> <li>• Tularemia</li> <li>• Tick paralysis</li> </ul>	<ul style="list-style-type: none"> <li>• Ehrlichiosis</li> <li>• Southern Tick Associated Rash Illness</li> <li>• Tularemia</li> <li>• Tick Bite-Induced Allergy (alpha-gal allergy)</li> </ul>	<ul style="list-style-type: none"> <li>• Research is ongoing</li> </ul>
<b>Notes</b>	<ul style="list-style-type: none"> <li>• The smallest northeast tick; nymphs, which can transmit disease, are the size of a poppy seed</li> <li>• Two-year lifecycle</li> <li>• Most active in spring and fall, but can be active year-round depending on weather</li> <li>• 3 - 7 days to ingest blood, depending on life stage</li> <li>• Require high humidity to survive</li> </ul>	<ul style="list-style-type: none"> <li>• The largest northeast tick</li> <li>• Only adults bite humans</li> <li>• Most active April through August</li> <li>• Each life stage can survive two years without a host</li> </ul>	<ul style="list-style-type: none"> <li>• The long mouthparts can inflict a painful bite</li> <li>• Highly attracted to CO<sub>2</sub></li> </ul>	<ul style="list-style-type: none"> <li>• Invasive species</li> <li>• A female can lay viable eggs without a mate</li> <li>• Appear to be less attracted to people than the other listed species</li> <li>• No male is shown because very few have been found in the U.S.</li> </ul>

### Identification

Ticks can be tricky to identify because (1) their sizes vary between different life stages, (2) males and females do not look alike, and (3) the size of larvae, nymphs, and adult females depends on how much blood they have ingested. All, however, have two body parts and eight legs as nymphs and adults. Larvae have only six legs. Ticks typically have a flattened appearance except when engorged on a blood meal, at which point they can take on the appearance of a small gray raisin with legs.

## Disease transmission and risks

Lyme disease, transmitted by the blacklegged tick, is the most common tick-borne illness resulting in over 300,000 new infections each year in the US. Lyme disease is caused by the bacterium *Borrelia burgdorferi*, which is transferred from a reservoir host to the saliva of a tick, and then to the blood of a human or other host. A reservoir host, such as a white-footed mouse, carries the bacterium without suffering any symptoms from the illness. And blacklegged ticks can transmit other pathogens that cause different diseases. Other tick species can also transmit disease-causing pathogens as outlined in the previous table. The most important and effective way to manage tick-borne diseases is to avoid being bitten.

## Monitoring for ticks

The easiest way to look for ticks is by dragging or flagging. Attach dowels on the ends of a 3'x 3' white flannel cloth to create your own tick drag. Drag the cloth over grass and brush and then identify and count the number of ticks clinging to the sheet. This should be done regularly, as tick populations fluctuate throughout the year.

Keep records of scouting results to determine whether the risk is increasing or decreasing, and gauge if management actions have been successful. When looking for an exemption under the Child Safe Playing Fields Act, proof of ticks will be needed.

## Management

The level of management (and justification for costs) should be determined by an active monitoring program to assess the risk of ticks and their hosts. Questions to ask and answer include:

- What type and how many ticks are found on the property?
- Are there areas of deer habitat (forests or fields) adjacent to the grounds?
- Are deer or turkey present on grounds?

## Managing the risk for ticks falls under four primary management practices:

- 1. Personal protection:** The most reliable protection against tick bites and disease transmission are protective measures such as:
  - Wearing light-colored pants and long-sleeved shirts so ticks can be spotted before they bite; additionally, tuck pants into socks
  - Permethrin-treated clothing
  - Conducting tick checks after leaving tick habitats
  - A note on repellents: Most repellents do not last longer than a few hours and are therefore not effective for tick exposure occurring in the afternoon or early evening. Repellents are pesticides and therefore cannot be applied by teachers, school nurses, or other school staff. They also cannot be applied by students to themselves due to the “Keep Out of Reach of Children” label.
  - Educate students, parents, and staff about personal protection

Additional information on personal protection, infographics such as the one shown to the right that can be printed as flyers or posters, and videos are available at [www.DontGetTickedNY.org](http://www.DontGetTickedNY.org).

- 2. Habitat modification:** Blacklegged ticks prefer high humidity, so look to reduce shady and damp areas in the play yard.



In the Northeast, Lyme disease is spread exclusively by the blacklegged tick and is the #1 vector disease in the United States. Photo: S. Bauer, Bugwood.org



Dragging for ticks can help identify areas where ticks are located. Photo: NYSIPM.

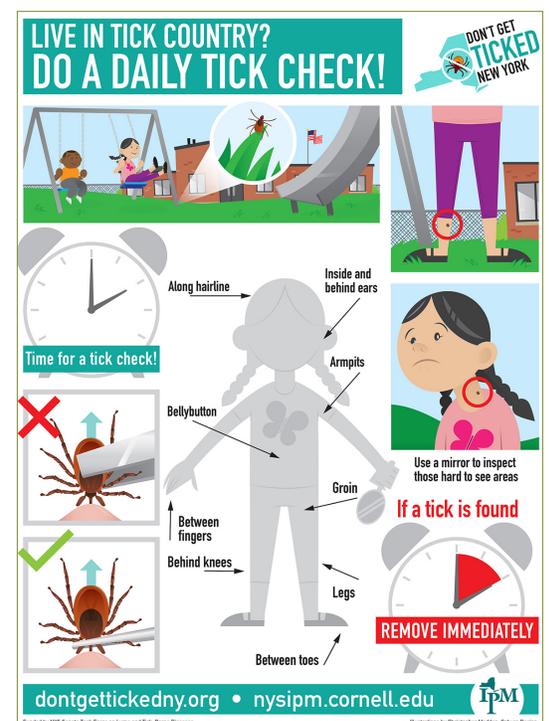


Illustration by C. Madden, coburndesign.com, for NYSIPM.

- Remove leaf litter from field edges near wooded or unmanaged areas
- Consider removing trees shading play areas if monitoring shows those areas have tick activity
- Wood mulch can store moisture, so if monitoring shows tick activity, consider replacing with a different, drier option
- Widen trails to reduce the risk of students brushing against vegetation
- Also look to eliminate habitat that attracts tick hosts
- Ensure food is cleaned from school grounds regularly
- Avoid putting bird feeders in areas where children play
- Relocate wood piles, stone walls or other structures that would shelter mice
- Replace plants that deer love to browse with deer resistant plants (Google “deer resistant plants Cornell”)
- Some invasive plants, such as Japanese barberry, honeysuckle, and multiflora rose, easily establish along wooded edges, and have been associated with higher concentrations of ticks carrying disease-causing pathogens

**3. Host exclusion:** In areas with high deer populations, installing a deer fence can help to reduce dispersal of ticks.

**4. Chemical control:** Consider pesticide applications if risk is unacceptable, but be sure to follow the Child Safe Playing Fields Act. Permission for an emergency exemption will need to be granted by the appropriate entity. For specifics on the law, visit the New York State Department of Environmental Conservation’s [Pesticide Use at Schools and Day Care Centers webpage, www.dec.ny.gov/chemical/41822.html](http://www.dec.ny.gov/chemical/41822.html).



Mice can carry ticks close to school buildings.  
Photo: David Cappaert/Bugwood.org



The dense nature of the Japanese barberry provides a humid environment, perfect for ticks, along with food and shelter for its small mammal hosts. Photo: NYSIPM.

### Helpful Links

[NYSIPM's Don't Get Ticked NY Campaign](http://www.DontGetTickedNY.org)

[NYS Department of Health](http://www.health.ny.gov/environmental/pests/tick.htm)

[NE Regional Center for Excellence in Vector Borne Diseases](http://www.neregionalvectorcenter.com/ticks)

[US Centers for Disease Control and Prevention: Lyme Disease](http://cdc.gov/lyme)

[TickEncounter Resource Center \(University of Rhode Island\)](http://tickencounter.org)

[Guidance Document on Child Safe Playing Fields Act](http://www.dec.ny.gov/docs/materials_minerals_pdf/guidancech85.pdf)

[Tick Identification](http://tickencounter.org/tick_identification)

[www.DontGetTickedNY.org](http://www.DontGetTickedNY.org)

[www.health.ny.gov/environmental/pests/tick.htm](http://www.health.ny.gov/environmental/pests/tick.htm)

[www.neregionalvectorcenter.com/ticks](http://www.neregionalvectorcenter.com/ticks)

[cdc.gov/lyme](http://cdc.gov/lyme)

[tickencounter.org](http://tickencounter.org)

[www.dec.ny.gov/docs/materials\\_minerals\\_pdf/guidancech85.pdf](http://www.dec.ny.gov/docs/materials_minerals_pdf/guidancech85.pdf)

[tickencounter.org/tick\\_identification](http://tickencounter.org/tick_identification)

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