# TICK-PROOF

*Protect your family, pets, and yard before the bite you never feel.*

First win in five minutes.

2026

# How to use this guide

Two things this guide is trying to do at once.

Avoid tick-borne disease, which is serious, expanding in range, and frequently misdiagnosed when it does happen.

Reduce the chemical exposure that usually comes with conventional tick prevention. The substances applied to skin, to children, to pets, to yard. What enters the body today adds to what entered last week and last year. For people already paying attention to that, the accumulation matters.

These two goals usually get framed as opposed. Most of that framing is false. Households that lean natural know Lyme is real. Households that lean conventional would generally prefer fewer chemicals if there is a working alternative. The actual question is the same one for almost everyone: what is the smallest chemical input that still does the job, given where you live, who is in the household, and how much exposure you actually have.

Natural options first, where they work. Conventional options second, with the real costs spelled out: what they put on the skin, what they ask the liver to process, what they do to a dog over years, what they do to the bees in the yard. You decide what is worth it for your situation.

## A two-tier vocabulary

Two words show up throughout. Knowing which is which is most of the work.

### Established vs. claimed

**Established.** Supported by published research, regulatory testing, or formal public-health consensus. Generally synthetic, generally regulated, generally backed by industry money for the studies that exist. Real, but not the whole picture.

**Claimed.** Supported by folk tradition, lab-bench effects, anecdotal use, or smaller independent studies. Often natural. The evidence base is thinner. That does not mean the claim is wrong. It means the claim has been tested less aggressively, often because there is less money in proving it.

Both categories belong in a serious guide. The job is to label which is which and let the reader decide.

## The six tools

The operational work of the guide lives in six printable tools. The surrounding text is context. The tools are what gets stuck on the door, the fridge, the garage wall, the glove compartment.

- 60-Second Risk Audit (Section 1)
- Yard Defense Checklist (Section 3)

- Personal Outing Prep Card (Section 4)
- Pet Tick-Check Routine (Section 5)
- Tick Bite Decision Flow (Section 6)
- Regional Risk Reference Card (Section 7)

Print them. Use them. Come back to the text when something changes.

*Not medical advice. This guide does not diagnose, treat, or replace a physician or a veterinarian. Where a clinical or herbal protocol is described, it is documentation of an existing approach so you can have an informed conversation with a professional. To find out which region you live in for risk purposes, see Section 7.*

# Quick Start

If you bought this guide because someone in the house just found a tick, use this page first.

Five moves, in order. Each is unpacked in detail in later sections; right now what matters is doing them in sequence.

**Right now**

1. Remove the tick with fine-tipped tweezers. Grasp at the skin, pull straight up with steady pressure, no twisting, no folk remedies. (Section 6.)
2. Save the tick on clear tape with the date written next to it. Photograph it. Note where on the body the bite was.
3. Estimate how long it was attached based on engorgement. Flat, swollen, or ballooned. (Section 6, Step 3.)
4. Find your region in Section 7. That tells you which diseases the tick most plausibly carries and how urgent the next step is.
5. If the bite happened in a high-Lyme region, the tick looks like a blacklegged tick, and engorgement suggests 36+ hours attached, you have a 72-hour window for either a single-dose doxycycline prophylaxis (established protocol, see Section 6, Scenario A) or, for readers who decline pharmaceuticals, an herbal-protocol decision to make with an integrative practitioner. (See Section 6.)

# Section 1: The 60-Second Risk Audit

Score yourself first. The audit takes about a minute and points you to the sections that matter most for your situation.

Tick exposure is uneven. People in different regions, with different yards, with different pets, with different habits, face dramatically different risk. Ranking that risk in advance is the difference between scattershot effort and surgical defense.

Print the next page. Check every box that applies. Add the points. The score tier at the bottom points you to where to start.

◆ **PRINT THIS PAGE: RISK AUDIT**

## 60-Second Tick Risk Audit

*Check every box that applies. Add the points in parentheses.*

**Where you live and spend time**

- ☐ Northeast, Mid-Atlantic, or Upper Midwest *(3)*
- ☐ Southeast or South-Central US *(2)*
- ☐ Southwest (AZ, NM, southern NV, southern UT) *(2)*
- ☐ Mountain West / Pacific Coast *(2)*
- ☐ My property borders or contains woods, brush, or tall grass *(3)*
- ☐ I or my family hike, hunt, garden, golf, or work outdoors *(2)*
- ☐ I see deer on or near my property *(2)*
- ☐ I see mice, voles, or chipmunks on my property *(2)*

**Your household**

- ☐ I have at least one dog that goes outside *(2)*
- ☐ I have an outdoor or indoor-outdoor cat *(1)*
- ☐ I have children under 12 in the home *(2)*
- ☐ Someone in the household is immunocompromised, pregnant, or over 65 *(2)*

**Your current habits**

- ☐ I do NOT use any tick repellent (natural or otherwise) when outdoors in tick season *(1)*
- ☐ I do NOT do a full-body tick check after outdoor time *(2)*
- ☐ My yard has not been mowed short, barrier-mulched, or otherwise managed for ticks this season *(2)*
- ☐ I have found a tick on a person or pet in this household within the last year *(2)*

**Total: _____ points**

## Reading your score

### 0 – 6 points · Low exposure

Habits and geography keep tick contact uncommon. The right move is awareness, not overhaul.

Start with: Section 2 (so you recognize what to look for) and Section 6 (the bite protocol).

Skip for now: heavy yard treatment, daily prep cards. Revisit if habits change.

### 7 – 14 points · Moderate exposure

At least one strong risk vector: region, yard, pet, or habit. Stop relying on luck.

Start with: Section 3 (yard defense, including beneficial wildlife) and Section 4 (personal protection).

Then add: Section 5 if you have pets, and the regional card from Section 7.

### 15+ points · High exposure

You live in a tick's ideal world. Stack every layer in this guide.

Start with: the full Section 3 yard intervention this weekend.

Then: build the Section 4 prep card into your outdoor routine, get pets on the layered defense in Section 5, and keep the Section 6 decision flow somewhere you can find it under stress.

One audit is a snapshot. Run it again in spring and again in fall. Your score moves as the season, your habits, and your household change.

# Section 2: How ticks find you

They do not jump. They do not fly. They wait. And they are very good at waiting.

Understanding the mechanism makes prevention obvious. Almost every common prevention failure traces back to one of three misconceptions: that ticks drop from trees, that you will feel one bite, or that adult ticks are the problem. None of those are true.

## Questing

Ticks find hosts through a behavior entomologists call questing. A tick climbs to the tip of a blade of grass, the edge of a leaf, or the top of a low branch, usually 6 inches to 3 feet off the ground, and waits. It extends its front pair of legs into the air. When something warm-blooded brushes past, it grabs on. That is the entire mechanism.

Ticks detect potential hosts using a sensory organ on their front legs called Haller's organ. It responds to carbon dioxide from breath, body heat, vibration, and shadow. They do not need to see you. They cannot, in any meaningful way.

That sensing is why the jumping myth survives. A tick clearly reacts to you. It feels the vibration of your steps, the carbon dioxide in your breath, the heat of your body. So it seems like it must have leapt or dropped from a branch to reach you. It did not. Those cues only tell the tick when to reach out its front legs and grab as you brush past at grass height. There is no muscle or mechanism behind those legs to jump, fly, or fall on a host below.

Once on a host, a tick crawls, sometimes for hours, looking for thin, warm, sheltered skin. Behind the knee. The groin. The armpit. The hairline. The waistband. Then it embeds its mouthparts (technically a hypostome), secretes a cement-like substance to anchor itself, and begins feeding.

### Why you almost never feel the bite

Tick saliva contains anesthetic and anti-inflammatory compounds. By the time you would normally feel a puncture or itch, the tick has already numbed the site and shut down the immune response that would tip you off. That is also how pathogens transfer with so little host resistance.

## The life cycle, and why the smallest tick is the dangerous one

Ticks pass through four life stages: egg, larva, nymph, adult. They need a blood meal to molt from one stage to the next, and a final meal to reproduce.

| Stage | Size | Notes |
|---|---|---|
| Egg | Microscopic | Laid in batches of 1,000–5,000. Not infectious to humans. |
| Larva | Poppy seed | Six legs. First blood meal usually from a small mammal, mice especially. Often where ticks acquire infection. |
| Nymph | Pinhead | Eight legs. The stage most likely to infect a human. Peak activity May–July. |
| Adult | Sesame seed | Eight legs. Visible. Peak activity in fall and again in early spring. |

## Field guide: know your ticks

The species you are most likely to meet, and the feature that gives each one away. Every photograph here is from the CDC and in the public domain. Full regional detail is in Section 7.

### Blacklegged or deer tick (Ixodes scapularis)

*Adult female (left) and nymph (right) on a fingertip. Image: CDC / Lauren Bishop, public domain. PHIL #28383.*

Reddish-brown, no white markings, long thin mouthparts. The nymph, shown at right, is poppy-seed small and does most of the disease transmission. Vector for Lyme disease, anaplasmosis, babesiosis, and Powassan virus.

### Lone star tick (Amblyomma americanum)

*Nymph, dorsal view. Image: CDC / James Gathany, public domain. PHIL #9535.*

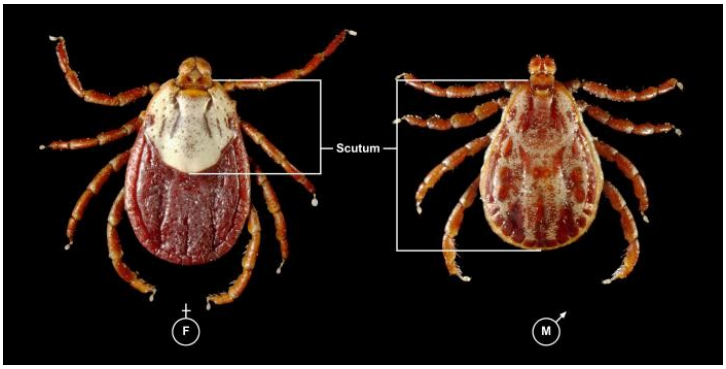
Round-bodied and aggressive. The adult female carries a single white dot on her back, which is not yet visible at the nymph stage shown here. Vector for ehrlichiosis, tularemia, and STARI, and the leading suspect behind alpha-gal syndrome.

## American dog tick (Dermacentor variabilis)

*Adult female, dorsal view. Image: CDC / James Gathany, public domain. PHIL #170.*

Larger and brown, with off-white markings on the dorsal shield. Tolerates open, grassy, sunnier ground that the deer tick avoids. Vector for Rocky Mountain spotted fever and tularemia.

## Rocky Mountain wood tick (Dermacentor andersoni)




*Adult male and female. Image: CDC / James Gathany, public domain. PHIL #10869.*

Mottled brown, similar to the American dog tick. Found at higher elevations across the Rocky Mountain and Intermountain West. Vector for Rocky Mountain spotted fever, Colorado tick fever, and tularemia.

## Gulf Coast tick (Amblyomma maculatum)

*Adult female, dorsal view. Image: CDC / James Gathany, public domain. PHIL #10876.*

Resembles the lone star tick but without the single white dot; the female's shield instead carries scattered pale markings. Coastal Southeast and Gulf, now expanding inland and north. Vector for Rickettsia parkeri, a spotted fever.

## Western blacklegged tick (Ixodes pacificus)

*Adult female, dorsal view. Image: CDC / James Gathany, public domain. PHIL #8686.*

The Pacific coast counterpart to the eastern deer tick, and nearly identical to the eye: reddish-orange body, dark shield, thin mouthparts. Vector for Lyme disease and anaplasmosis, though infection rates run lower than in the Northeast.

## Brown dog tick (Rhipicephalus sanguineus)

*Adult male, dorsal view. Image: CDC / James Gathany, public domain. PHIL #7644.*

Uniform reddish-brown and elongated, with a hexagonal base where the mouthparts attach. The one tick that can complete its whole life cycle indoors, which is how kennels and houses become infested. Linked to Rocky Mountain spotted fever in the Southwest.

## Pacific Coast tick (Dermacentor occidentalis)

Closely resembles the American dog tick shown above: a mottled grey-white ornate shield on a brown body. Found along the California and Oregon coast and the inland foothills. Vector for Pacific Coast tick fever, and a suspected player in Rocky Mountain spotted fever and tularemia in the West.

For photographs of this species, see [BugGuide: Dermacentor occidentalis](BugGuide: Dermacentor occidentalis).

**Lone star tick: what a blood meal does**

**Unfed adult female**
*flat, about 3 mm*

**Engorged**
*after a blood meal*

*Lone star tick: unfed adult female and an engorged female after feeding. Images: CDC / James Gathany, public domain. PHIL #8682 and #8679.*

Every hard tick swells like this as it feeds, often to five or ten times its unfed size, and its color shifts from reddish-brown to a smooth grey. An engorged tick can look so unlike its unfed self that people do not recognize it as the same animal, or as a tick at all.

### See every species and life stage

The photographs above are public domain. For complete life-stage sets, larva through adult side by side, and for any species not pictured here, these public health galleries are the best free references:

CDC, tick life cycles: cdc.gov/ticks/about/tick-lifecycles.html

Minnesota Dept. of Health, photos by life stage: health.state.mn.us/diseases/tickborne/ticks.html

Washington State Dept. of Health, tick photo gallery: doh.wa.gov tick photo gallery

Across most of the US, the nymph is the version of the tick that infects humans most often. Two reasons: nymphs are small enough to escape a casual visual check, and their peak activity coincides with the warm months people spend outdoors. By the time a tick is an adult, visible, slow, easy to spot, most of the disease transmission for the year has already happened.

### If you only remember one sentence from this section

**The dangerous tick is the one the size of a poppy seed, and you have to look for it on purpose.**

## The five ticks you are most likely to meet

More than 90 tick species occur in the US. Five account for the overwhelming majority of human encounters and human disease.

| Tick | Range | Notable diseases | Peak risk |
|---|---|---|---|
| Blacklegged tick (Ixodes scapularis), also called deer tick | Northeast, Mid-Atlantic, Upper Midwest, expanding south and west | Lyme disease, anaplasmosis, babesiosis, Powassan virus, Borrelia miyamotoi | Nymphs: May–July. Adults: October–November and March–May. |
| Western blacklegged tick (Ixodes pacificus) | Pacific Coast, especially Northern California | Lyme disease, anaplasmosis | Year-round in mild climates. Peaks in cooler, wet months. |
| Lone star tick (Amblyomma americanum) | Southeast, South-Central, expanding into Midwest and Northeast | Ehrlichiosis, STARI, alpha-gal syndrome, Heartland and Bourbon viruses | April–August. |
| American dog tick (Dermacentor variabilis) | East of the Rockies and parts of the Pacific Coast | Rocky Mountain spotted fever, tularemia | April–August. |
| Rocky Mountain wood tick (Dermacentor andersoni) | Rocky Mountain states, elevations 4,000–10,500 ft | Rocky Mountain spotted fever, Colorado tick fever, tularemia | March–July. |

A sixth species worth knowing about, even though it is not in the high-frequency human-encounter group above: the brown dog tick (Rhipicephalus sanguineus). It is the one tick that infests indoor spaces, a worldwide nuisance for dog owners, and a vector for Rocky Mountain spotted fever in specific regional outbreaks (notably parts of Arizona).

Section 7 maps these species to specific regions in a printable reference card. For now: knowing which tick you are likely to meet sets your expectations for what to watch for after a bite.

# Section 3: Yard defense

The yard is where most suburban tick exposure happens. Most homeowners defend it backward.

In one widely cited study of suburban Connecticut, more than three-quarters of tick exposures leading to Lyme disease occurred on the person's own property. Not deep in the woods. The yard. Which means the yard is also the single most controllable variable in the whole stack.

Effective yard defense is not a chemical question first. It is a habitat question first, a host-and-predator question second, and a chemical question last. In that order. Most homeowners reverse the order, spray the whole property, and wonder why ticks come back the next month with a slightly different mix of fauna.

## Where ticks actually live in your yard

The blacklegged tick, the deer tick that carries Lyme and drives most yard risk in Lyme country, needs three things to survive: humidity around 80% or higher, leaf litter or low ground cover, and a steady supply of mammals to feed on. It does poorly in sustained sun and dry mowed lawn. It thrives in:

- The woodland edge, the first 10 feet inside any wooded or brushy boundary
- Leaf litter, especially under shrubs and along fence lines
- Stone walls, woodpiles, brush piles, anything that shelters mice
- Ornamental ground cover (pachysandra, ivy) in shaded beds
- Long grass along driveways, paths, and play areas

For the deer tick, the middle of a sunny, regularly mowed lawn is low-risk. The transition zone between lawn and brush is where you encounter it. That single insight drives most of the rest of this section.

One caveat, and it matters more the farther south and west you live. Not every tick needs damp shade. The American dog tick survives warm, dry roadsides, trails, and open lawns. The lone star tick, aggressive and pushing north, tolerates sunnier and drier ground than the deer tick does. And the brown dog tick, the species behind most tick concern in Arizona and the Southwest, is built for hot, dry, low-humidity conditions in and around homes. So if you have seen a tick on a sunlit picnic table or in short grass in full sun, you were not imagining it. The shade-and-edge rule still governs most Lyme risk, because the deer tick drives most Lyme. Treat it as a deer-tick rule, not a law of nature. A sunny desert yard is lower risk, not guaranteed safe.

## The four layers of yard defense

### Layer 1. Habitat reduction

The largest single intervention you can make and the only one that compounds year over year. None of it requires chemicals.

- Mow the lawn to 3 inches or shorter (weekly during growing season). Tick survival drops sharply on regularly mowed turf.
- Remove leaf litter in spring and fall.
- Trim back overgrown shrubs and clear brush from edges and fence lines.
- Stack firewood neatly, off the ground, in a dry sunny location.
- Move swing sets, sandboxes, and outdoor furniture away from wood edges (at least 9 feet) and into sun.
- Keep ornamental ground cover trimmed and out of high-use areas.

### Layer 2. The barrier zone

Public-health guidance from the CDC describes a simple but effective intervention: a 3-foot-wide strip of wood chips, gravel, or mulch between any lawn area and the wooded or brushy edge of the property. It works because ticks do not crawl readily across dry, hot, low-humidity surfaces. The barrier physically interrupts their movement onto the lawn.

Install one along every wooded edge and around any high-use area: patio, play structure, garden bed, dog run.

### Layer 3. Host management

Adult blacklegged ticks feed primarily on deer. Larval and nymphal blacklegged ticks feed primarily on white-footed mice, and that is where most of the Lyme bacteria they later transmit comes from. Manage the hosts, and you collapse the tick population over a few seasons.

- Deer-proof what you can: tall fencing where practical, deer-resistant plantings near the house, no deliberate feeding.
- Reduce mouse habitat: seal entry points to outbuildings, store birdseed and pet food in sealed bins, remove brush and rock piles near the house.
- Tick tubes: cardboard tubes packed with permethrin-treated cotton, distributed around the yard in spring and again in late summer. Mice take the cotton to line their nests; the permethrin kills larval ticks feeding on the mice. This is one of the few yard interventions targeted specifically at the disease-cycle bottleneck rather than the visible adult tick.

*Commercial options: Thermacell Tick Control Tubes (go.tickguide.com/thermacell-tick-tubes); or DIY (cardboard toilet-paper tubes, permethrin-treated cotton, distributed in spring and fall).*

## Layer 4. Acaricide application (if you choose)

Direct application of EPA-registered acaricides (typically bifenthrin, cyfluthrin, or permethrin formulations) to the lawn perimeter, woodland edge, and barrier zone reduces tick numbers significantly when timed correctly.

- First application: early to mid-May (targets active nymphs).
- Second application: October (targets active adults).
- Spot-treat the perimeter and high-use areas, not the entire lawn.
- Follow product label exactly. Re-entry intervals exist for a reason.

DIY versus professional: professional treatment is more expensive but typically covers a higher dose and includes a service guarantee. DIY from EPA-registered concentrates is effective when applied carefully. The biggest predictor of success is timing, not who applies it.

### What acaricides do and do not do

They knock down the tick population in a treated area for 4 to 8 weeks. They are not residual the way termite treatment is. They do not tick-proof a yard. They are one layer of a stack, not a substitute for the other three. Whether to use them at all is a household decision that depends on chemical-load preferences, pollinator concerns, and how high the tick pressure actually is.

## Lower-chemical yard treatments

For households that want to reduce or eliminate synthetic acaricide use, several plant-derived options exist. Effectiveness varies. Reapplication intervals are shorter.

- Cedar oil sprays (Cedarcide Tactical (go.tickguide.com/cedarcide-tactical), Wondercide Yard Spray (go.tickguide.com/wondercide-yard)). Cedar-derived terpenes documented as acaricidal in published studies. Shorter residual than synthetic acaricides. Generally considered safe around pets and pollinators after drying.
- Garlic-based yard sprays (Mosquito Barrier, Garlic Barrier). Sulfur compounds in concentrated garlic juice show repellent and some acaricidal effects in field studies. Smell dissipates over a day or two.
- Beneficial nematodes (Steinernema and Heterorhabditis species). Microscopic soil-dwelling worms that parasitize tick larvae and other soil-stage pests. Available from garden suppliers. Apply to moist soil in spring.
- Geraniol- or rosemary-oil-based commercial mixes (EcoSMART, EcoVia).

Practical position: cedar oil and garlic-based sprays are reasonable substitutes for synthetic acaricides on small properties with moderate tick pressure. On high-pressure properties (heavy deer, dense forest edge, prior tick-borne illness in the household), the synthetic option has a longer track record and lower reapplication burden. The split is not natural-vs-chemical absolutism. It is matching the tool to the situation.

A separate question comes up constantly: do tick-repellent plants work? Marigolds, chrysanthemums, cedar. The answer splits three ways.

- Cedar earns its reputation. Cedarwood oil both repels and kills several major tick species in published USDA testing, and a cedar mulch strip works as a barrier the same way a wood-chip border does. Of the three, this is the one with real evidence behind it, in oil or mulch form.
- Chrysanthemums contain pyrethrin, a genuine natural insecticide (it is the compound that synthetic permethrin imitates). But you get that effect from pyrethrin products, not from planting a few mums as a border. Credit the compound, not the flowerbed.
- Marigolds are the popular pick with the thinnest support. They repel some garden pests, but the tick studies use concentrated extracts, and there is little evidence the living plant does much against ticks. Pleasant to grow, not a defense to rely on.

## Beneficial wildlife: the tick predators worth keeping around

Most properties already have natural tick reduction at work. The trick is not to drive it off.

A surprising amount of tick control on a property happens without human intervention, through animals that either consume ticks directly or consume the small mammals that host ticks at the larval and nymphal stages. The mainstream yard-defense literature underweights this. The natural-yard literature sometimes overstates it. The truthful middle is that a property managed with these animals in mind will carry a lower tick burden than one managed against them, often without any chemical input at all.

### Direct tick predators

**Guinea fowl.** Native to West Africa, kept on US homesteads for over a century specifically for tick consumption. Free-ranging guinea fowl forage aggressively, eat ticks at every life stage, and patrol large areas of yard and pasture without damaging garden beds the way chickens do. Tradeoffs: they are noisy (especially as alarm callers, which is also their main value to small-livestock keepers), require a coop and predator protection at night, and need some training to return to the coop. A flock of 4 to 6 covers a typical suburban acre. The most evidence-supported single non-chemical tick intervention available to a homeowner who can keep poultry.

**Opossums.** Research from the Cary Institute of Ecosystem Studies (Keesing, Ostfeld, and colleagues, 2009 and follow-ups) documented opossums as exceptional groomers, consuming the vast majority of ticks that try to attach to them. The often-cited number of 5,000 ticks killed per opossum per season has been disputed in later work and is probably overstated. The directional finding holds: opossums are net tick consumers, not vectors, and a healthy opossum population on a property reduces tick load. They do not eat much garbage, do not attack pets, and are not aggressive. The right response when you see an opossum on the property is to leave it alone.

**Wild turkeys, ducks, chickens.** All consume some ticks while foraging. Less effective per bird than guinea fowl. Chickens damage garden beds. Ducks need water. Turkeys move through but rarely settle. Worth tolerating if they pass through. Not worth keeping specifically for tick control compared to guineas.

### Indirect tick reduction: small-mammal predators

White-footed mice are the primary blood-meal source for larval and nymphal blacklegged ticks across most of the eastern US. They are also the primary reservoir for the Lyme bacteria that those ticks pick up at the larval stage. Anything that controls mouse populations reduces both tick density and the disease-load fraction of those ticks.

**Owls and hawks.** Each large owl or hawk on a property consumes hundreds of small mammals per year. Provide perches and nest boxes (great horned owl boxes, screech owl boxes, barn

owl boxes are all commercially available and easy to install). Stop using rodenticides on the property. Rodenticides bioaccumulate in raptors and kill exactly the predators you want.

**Foxes.** Published research from Levi and colleagues (2012) linked higher fox densities with lower Lyme incidence at the county level across the eastern US, plausibly because foxes consume mice and outcompete the smaller predators that mice avoid less effectively. Foxes are not a pest. They rarely attack pets or poultry larger than chickens (and chickens need their own protection regardless). A fox den near the property is good news.

**Non-venomous snakes.** Black rat snakes, garter snakes, and similar species consume mice and voles. They are not a threat to people or pets. The right response to a non-venomous snake on the property is the same as the right response to an opossum: leave it alone.

**Domestic cats outdoors.** Cats hunt mice effectively, but they also bring fleas and ticks back into the household. The tick-control benefit is real, but for tick management it is usually outweighed by the ticks the cat carries in. Keeping cats indoors is the cleaner call.

## Small invertebrate predators

Ground beetles, certain ant species, and wolf spiders consume tick eggs and larvae in soil and leaf litter. Soil health matters. A property heavily treated with broad-spectrum insecticide loses these predators along with the targets and frequently sees a tick rebound the following season. Spot-treating perimeters preserves more of the invertebrate predator community than blanket application.

### What not to attract

Deer are the primary host for adult blacklegged ticks and the engine of the disease cycle on most suburban properties. Do not feed deer. Plant deer-resistant species near the house. Tall fencing where you can.

Note: keeping mice in check matters more than eliminating mice (which is not possible). The goal is a property where predators above the mouse in the food web are healthy, not a property scrubbed of small mammals.

◆ **PRINT THIS PAGE: YARD DEFENSE CHECKLIST**

## Yard Defense Checklist

*Frequencies vary by item. Walk the property with this in hand at the start of each tick season; revisit weekly or quarterly as marked.*

**Weekly through growing season**

- ☐ Lawn mowed to 3 inches or shorter
- ☐ Visible leaf accumulation cleared from beds and paths

**Twice yearly (spring and fall)**

- ☐ Heavy leaf cleanup along fence lines, beds, and woodland edge
- ☐ Brush and overgrown shrubs trimmed back
- ☐ Tick tubes deployed (April–May and again August–September)
- ☐ If acaricide use: spring application early–mid May (target nymphs); fall application October (target adults)

**Annually or at season open**

- ☐ Firewood stacked off the ground, in a sunny location
- ☐ Play equipment, patios, swings: at least 9 ft from any wood edge
- ☐ No ornamental ground cover in high-use zones
- ☐ 3-foot wood chip / gravel barrier installed and topped up between lawn and woods
- ☐ Outbuildings sealed against rodents
- ☐ Birdseed and pet food in sealed containers

**Predator-friendly management (ongoing)**

- ☐ No rodenticides on the property
- ☐ Owl box installed where habitat supports it
- ☐ Opossums and non-venomous snakes left alone
- ☐ Guinea fowl considered if zoning and household permit

**Deer management**

- ☐ Deer browse pressure reduced (fencing, plantings, no feeding)

**Date completed:** _____ **Next major review:** _____

# The tick-season calendar

When to do what. Mark your own dates in the margin.

Tick management is seasonal. Doing the right thing at the wrong month is often as useless as doing nothing. The calendar below maps the four-layer yard stack, the personal-protection cycle from Section 4, and the pet routine from Section 5 onto a typical North American year. Adjust earlier in the South, later in the North.

◆ **PRINT THIS PAGE: SEASONAL CALENDAR**

## Tick-Season Calendar

| Window | Yard | People | Pets |
|---|---|---|---|
| Feb–Mar | Audit yard. Order tick tubes, repellent, permethrin spray (or cedar / garlic alternatives). | Restock outing prep kit. Re-treat permethrin or natural-treated clothing if DIY. | Confirm preventative supply (vet-prescribed or natural blend) and dosing schedule. |
| Apr | First leaf cleanup. Trim brush. Inspect barrier zone. | Resume daily repellent use on outings. | Begin year-round preventative if not already on one. |
| Early May | First acaricide or cedar/garlic application. Target: nymphs. Deploy spring tick tubes. | Add prep card to door. Begin post-outing tick checks. | Daily tick checks after outdoor time. |
| May–Jul | Maintain mowing. Re-mulch barrier as needed. | Peak nymph season. Full stack engaged every outing. | Continued daily checks; closer attention on long days outside. |
| Aug–Sep | Deploy second round of tick tubes. | Maintain repellent and clothing protocol. | Continued daily checks; watch for lethargy or joint stiffness. |
| Oct | Second acaricide or cedar/garlic application. Target: adults. | Maintain protocol; adults peak this month. | Maintain protocol; vet check at annual exam. |
| Nov–Jan | Final leaf cleanup. Plan next year's habitat work. | Reduce intensity. Check on warm-spell outings only. | Maintain preventative. Adult ticks remain active during winter warm spells. |

*Tick activity does not stop at the calendar boundary. Adult blacklegged ticks become active any day above approximately 40°F. Mild winters extend the season; cold wet springs delay it.*

# Section 4: Personal protection

Tick checks fail when they are the only layer. Stack the four below and the tick check becomes a safety net, not the safety system.

Personal protection works the same way yard defense does: layers, in order, each accepting that the one above it will sometimes fail. The body has four layers worth thinking about.

## Layer 1. Repellent on skin

The right starting question is not which repellent works best in the abstract. It is which one puts the least synthetic chemistry on the skin, in the bloodstream, and in the body over time while still working for the exposure in front of you. Throughout this section, when this guide talks about a product having a higher or lower "input," it means what the skin absorbs and the body processes, not what it costs at the store.

A weekend yard walk in a low-tick neighborhood and a dawn hike through lone-star country at peak nymph season are different problems. Treating them with the same product does not make sense in either direction.

The stack, ranked from lowest to highest body-input.

### Tier 1. Plant-derived, regulatory-recognized

**Oil of lemon eucalyptus (OLE), 30%, also sold as PMD.** The only plant-derived repellent the CDC affirmatively recommends. Peer-reviewed studies show roughly six hours of protection against blacklegged ticks at 30% concentration, comparable to lower-concentration DEET in field tests. EPA-registered as a biopesticide. Distinctive lemon scent that some people love and some quietly abandon after a week.

*Commercial options: Repel Lemon Eucalyptus (go.tickguide.com/repel-ole); Murphy's Naturals Lemon Eucalyptus Insect Repellent Spray (go.tickguide.com/murphys-ole); Cutter Lemon Eucalyptus (go.tickguide.com/cutter-ole). Not recommended for children under three. DIY recipe (30 drops OLE in 4 oz witch hazel) is widely circulated and works, with the caveat that concentration is harder to control than in commercial product.*

### Tier 2. Synthetic, lower body absorption

**Picaridin, 20%.** Synthetic, but synthesized from a compound originally found in black pepper plants. Performance comparable to 30% DEET in head-to-head testing, with a better profile in published toxicology. No documented neurological concerns, no plastic-melting, no greasy feel, no measurable skin penetration at the levels DEET produces. The closest thing to a best-of-both-worlds pick when OLE does not work for skin or nose.

*Commercial options: Sawyer Premium Insect Repellent Picaridin (go.tickguide.com/sawyer-picaridin); Ben's Tick Repellent Eco-Spray (go.tickguide.com/bens-picaridin); Natrapel Tick & Insect Repellent (go.tickguide.com/natrapel); Ranger Ready Picaridin (go.tickguide.com/ranger-ready).*

## Tier 3. DEET, with the costs labeled

DEET has the longest track record by decades and the strongest peer-reviewed efficacy data. It also has the strongest set of concerns of any actively-recommended product in this list. What the literature shows, on both sides:

In favor: documented effectiveness against ticks at 20–30% concentration. Generally accepted as safe by the EPA at those levels for adults and for children over two months. Available everywhere. Inexpensive.

Against: skin absorption is measurable, with plasma concentrations documented in human studies. Animal studies show neurotoxicity at high doses. Scattered case reports of seizure in humans, rare but real. Documented interaction with permethrin uptake when the two are used together. Dissolves certain plastics and synthetic fabrics. Decades of use without a clearly identified chronic-exposure cohort, which is a different kind of evidence than absence of harm.

Position: DEET is not banned from the kit. It is reserved for situations where the tick density is high, the exposure window is bounded (a single hike, a single hunt, a single weekend), and the disease cost of getting bitten is meaningfully higher than the chemical cost of one application. It is not the right product for daily, season-long, family-wide use. Those use cases belong to OLE or picaridin.

*Commercial options if needed: OFF! Deep Woods (go.tickguide.com/off-deep-woods); Ben's 30% DEET Tick & Insect Repellent (go.tickguide.com/ultrathon); Repel Sportsmen Max (go.tickguide.com/repel-sportsmen-max).*

## Tier 4. Essential oils and plant extracts (claimed)

Below the tiers above, a group of plant-derived options with measurable lab effects, shorter durations, and weaker field testing. Reasonable for low-pressure, short-duration outings. Reapply often.

- Geraniol (rose geranium oil). Lab studies show measurable tick repellency at 5–10% concentration. The US military's Insect Repellent Coordinating Board has reviewed it favorably for short-duration use. Two to three hour reapplication.
- Cedarwood oil. Established as a non-toxic acaricide in some formulations. Modest documented effect as a skin repellent.
- Catnip oil (nepetalactone). Iowa State University research showed nepetalactone roughly ten times more effective than DEET as a mosquito repellent. Tick-specific data is thinner. Anecdotal use is widespread.
- Clove, thyme, oregano, citronella. All show repellent activity against ticks in published lab studies. All require frequent reapplication. Reasonable for backyard time in low-pressure regions.
- Combined commercial natural formulations. Consumer Reports tick-specific testing found several plant-oil products effective enough for short outings, the All-Terrain

(go.tickguide.com/all-terrain) and Babyganics (go.tickguide.com/babyganics) lines among them. Badger Bug Spray (go.tickguide.com/burts-bees) is a comparable plant-oil option.

### Reading the stack, written down

For maximum efficacy with the least chemistry absorbed by the body, OLE/PMD at 30% is the pick.

If OLE does not work for skin or nose, picaridin at 20% is the runner-up with no meaningful efficacy drop and a better absorption profile than DEET.

If the trip is into peak nymph season in a high-Lyme region with multi-hour exposure where missing a tick has real consequences, DEET enters the conversation as a single-use tool, not a daily habit.

For low-pressure yard time, essential oils with frequent reapplication will do.

*No single product does everything. The stack is the answer, not the perfect repellent.*

## Layer 2. Permethrin (or cedar) on clothing and gear

The single most underused tool in personal tick defense, and arguably the most effective: treat clothing and gear, not skin. Worn permethrin-treated socks and footwear have been shown in published research to reduce tick attachment by an order of magnitude (people wearing permethrin-treated sneakers and socks were 73.6 times less likely to be bitten by a tick than those wearing untreated footwear, in one Lyme Disease Association field study).

Permethrin is a synthetic version of pyrethrin, a compound found in chrysanthemum flowers. The natural pyrethrins are short-lived and break down rapidly in sunlight. Synthetic permethrin is more durable. Some natural-product purists object to it on those grounds. The opposing view: permethrin binds tightly to fabric and is not absorbed through skin in measurable amounts once dried. It is one of the relatively rare cases where the synthetic version of a natural compound gets used in a way that minimizes downstream exposure.

Two ways to use it.

- DIY 0.5% permethrin spray (sold under brands like Sawyer and Ben's). Treat clothing on a hanger, outside, until lightly damp; let dry completely. Treatment lasts roughly 6 weeks or 6 washes.
- Factory-treated clothing (Insect Shield, ExOfficio BugsAway, and similar lines). Treatment is bonded into the fabric and lasts approximately 70 washes, effectively the life of the garment.

*Commercial options: Sawyer Permethrin Insect Repellent for Clothing (go.tickguide.com/sawyer-permethrin); Ben's Clothing & Gear Insect Repellent (go.tickguide.com/permanone); Insect Shield treated clothing (go.tickguide.com/insect-shield); ExOfficio BugsAway line (go.tickguide.com/exofficio-bugsaway).*

For households that decline permethrin: cedar oil clothing sprays (Cedarcide Tactical Spray, Wondercide Outdoor Spray) provide a shorter-duration alternative with weaker but documented repellent effects. Plan on much more frequent reapplication, every couple of hours of active outdoor exposure.

### Two cautions on permethrin

Permethrin is highly toxic to cats while wet. Treat clothing in a space cats cannot access. Let it dry completely (typically 2 to 4 hours) before bringing it indoors.

Permethrin is also acutely toxic to bees and aquatic life when wet. Treat away from gardens, ponds, and bee activity, and let it dry before returning to those areas. Once dry on fabric, it is tightly bound and poses minimal exposure risk to the wearer.

## Layer 3. Clothing strategy

Independent of any chemistry, what you wear and how you wear it changes the math.

- Light-colored clothing. A tick on khaki is visible long before a tick on black jeans.
- Long pants tucked into socks. Long-sleeved shirts tucked into the waistband. Looks ridiculous; works.
- Closed shoes, not sandals.
- A hat. Ticks find their way onto the scalp more often than people realize, particularly in tall brush.
- Outdoor clothing separate. Change on a porch or in a mudroom rather than dragging it through bedrooms or across upholstery.

## Layer 4. Post-exposure protocol

Assume a tick will eventually make it through. The three steps that close the loop:

1. Sweep with a TickMitt (a microfiber tick-catching glove) over clothes, exposed skin, and gear as you come in from the field. The mitt picks off loose ticks before they find skin. (go.tickguide.com/tickmitt)
2. Tumble-dry outdoor clothes on high heat for at least 10 minutes as soon as you come in. Heat kills ticks better than washing does. Washing alone, even on hot, kills inconsistently.
3. Shower within two hours of coming inside. The shower washes off unattached ticks, allows visual check on hard-to-see areas, and is associated in published research with reduced Lyme disease risk.

No mitt on hand? A lint roller or a strip of clear packing tape does the same job for loose, unattached ticks. Roll or press it over clothing, hair, and exposed skin, and the tick lifts off onto the adhesive. Cheap, and worth keeping one by the door. One limit to be clear about: this is only for ticks that have not bitten in yet. A tick already attached and feeding comes out with fine-tipped tweezers, never tape (Section 6).

Then, the tick check. Methodically.

**Where to actually look, in order**

- Behind and inside the ears
- The hairline and through the scalp
- Under the arms

- Inside the belly button
- Around the waistband
- Backs of the knees
- Between the legs and groin
- Between the toes

*Get a partner or a hand mirror. Nymphs are the size of a poppy seed and gravitate to skin folds you cannot easily see yourself.*

## Dietary supplements claimed to deter ticks

What you swallow, not what you spray.

Garlic. Brewer's yeast. B-complex vitamins, especially B1 (thiamine). Apple cider vinegar. Each shows up in folk literature, in old hunter and gardener manuals, in pet-supplement product lines, in the comment sections of every Lyme forum on the internet. Each has supporters who use it religiously and skeptics who dismiss it categorically. The accounting in between is more interesting than either camp lets on.

### Garlic

Sulfur compounds in fresh garlic alter sweat and skin chemistry in measurable ways. Limited studies of garlic extracts applied topically have shown tick deterrent effects. Whether eaten garlic produces enough downstream chemistry to affect tick attachment at human-host scale is less clear. The effect is mechanistically plausible. Magnitude is not well-established. Garlic toxicity to dogs at higher doses is well-documented (Heinz body anemia); toxicity in humans at culinary doses is essentially nil.

### Brewer's yeast

A 1983 controlled study found that active brewer's yeast in the diet of dogs reduced flea counts versus inactive yeast. Tick-specific data is sparser and predominantly anecdotal. The presumed mechanism is dietary B-vitamins altering the host's scent profile. Many integrative veterinarians recommend it as a supplemental layer. Many conventional veterinarians dismiss it. Both can be true at once: a modest effect that real users notice and that randomized studies have not decisively confirmed. Brewer's yeast also delivers an uncontroversial bonus regardless of the tick question: B-complex vitamins, protein, minerals, and live cultures of Saccharomyces cerevisiae that show up in coat and skin quality.

### B-complex vitamins, particularly B1 (thiamine)

Folk tradition holds that thiamine excreted in sweat produces an odor unattractive to biting insects. Controlled human studies have repeatedly failed to demonstrate this for mosquitoes. Tick-specific controlled testing is essentially absent. The folk claim persists in part because some people report success and in part because B-vitamin supplementation has other health upsides that get attributed to the bite reduction. Best read: not a primary defense, not a substitute for topical or environmental layers. B-complex supplementation has reasonable independent grounds (energy, nervous-system support, methylation) and a possible tick benefit on top of those is not unreasonable to hope for, but not something to count on.

### Apple cider vinegar

Long folk tradition, no controlled evidence supporting tick repellency from ingestion. Limited topical evidence as a mild repellent in some formulations. Falls in the low-downside, low-

likelihood-of-meaningful-effect category. Useful as a daily habit for users who already drink it; not worth starting for tick reasons alone.

### Position on the category

If these supplements are already in the diet, lean in. The downside is minimal and the supporting nutrition is real.

If they are not, don't reorganize the kitchen around them. Yard work, clothing protocol, and post-exposure habits do the heavy lifting of tick defense.

◆ **PRINT THIS PAGE: OUTING PREP CARD**

## Outing Prep Card

*Stick this on the inside of the door you leave through.*

**Before going out**

- ☐ Long pants on, tucked into socks
- ☐ Long-sleeve shirt on, tucked in
- ☐ Light colors
- ☐ Closed shoes or boots
- ☐ Repellent applied to exposed skin (OLE, picaridin, DEET if high-risk situation, or essential-oil blend for low-pressure)
- ☐ Permethrin-treated clothing on (or cedar-spray-treated alternative)
- ☐ Hat on

**On return**

- ☐ Outdoor clothes straight into the dryer. High heat, 10+ minutes.
- ☐ Shower within 2 hours
- ☐ Full tick check: ears, hairline, armpits, waistband, knees, groin, between toes
- ☐ Pets checked if they came along (see Section 5)
- ☐ Found a tick on a person? Go to Section 6 immediately.

**Date:** _____ **Location:** _____ **Notes:** _____

# Section 5: Pet protection

Pets do not transmit Lyme directly to humans. They do something arguably more important: they bring live ticks into the house.

Dogs and outdoor cats are the most common mechanism by which ticks cross the threshold from yard to indoor environment. A tick that fails to attach to a dog on a trail can drop off on the couch and find a human host three hours later. Pet protection is therefore household protection.

There are two parallel goals. Protect the pet itself from tick-borne disease. Prevent live ticks from hitching a ride indoors.

The pet category is also the place where the natural-versus-conventional tension shows up sharpest. The natural alternatives have weaker evidence for dogs than for human personal protection. The conventional alternatives are highly effective and also have a documented (though usually mild) side-effect profile. Reasonable households end up in different places. The information below is what reasonable households use to decide.

## Natural and supplemental options

Worth considering first, particularly for low-pressure households, dogs with sensitive systems, or owners who prefer to minimize pharmaceutical input.

### Brewer's yeast and garlic supplements

Discussed in detail in Section 4. For pets specifically, the combined supplements (brewer's yeast, garlic, B-vitamins, sometimes apple cider vinegar) are widely sold and used. Evidence is mixed. Anecdotal user reports are consistently positive. Veterinary opinion is split between integrative practices that recommend them as a supplemental layer and conventional practices that dismiss them. Garlic dose matters: products formulated for dogs use small amounts below the toxicity threshold; do not free-feed culinary garlic to dogs.

*Commercial options: Only Natural Pet Brewer's Yeast & Garlic Chews (go.tickguide.com/onlynaturalpet-bg); NaturVet Brewer's Yeast with Garlic (go.tickguide.com/naturvet-bg); Vet's Best Brewer's Yeast & Garlic Chews (go.tickguide.com/vets-best-bg); PetHonesty Flea & Tick Defense Chews (go.tickguide.com/pethonesty-ft).*

### Topical natural sprays and rubs

Cedar oil, essential-oil blends, and geraniol formulations are sold for direct application to pet coats. Effectiveness varies. Several have measurable repellent effects in laboratory testing; field performance is shorter-duration than prescription topicals. Most work as one layer in a broader stack rather than a standalone defense.

*Commercial options: Wondercide Flea & Tick Spray for Pets (go.tickguide.com/wondercide-pet); Vet's Best Flea & Tick Spray (go.tickguide.com/vets-best-spray); Cedarcide Tickshield (go.tickguide.com/cedarcide-tickshield); Earth Animal Nature's Protection (go.tickguide.com/earth-animal).*

Caution on essential oils for cats: many essential oils that are well-tolerated by dogs are toxic to cats. Tea tree oil, pennyroyal, and (separately) permethrin in any concentration are particularly dangerous. Always check feline-specific formulations or ask your vet before applying anything to a cat.

## Diatomaceous earth

Food-grade diatomaceous earth dusted into pet bedding and yard areas damages the exoskeletons of fleas, ticks, and other invertebrates by mechanical action. Effective on contact, slower to act than chemical products, less durable than acaricides. Reasonable as a yard and bedding supplement; not a substitute for body-mounted prevention. Use food-grade only; do not inhale the dust.

## Vet-prescribed preventatives

The most well-studied and effective single layer of pet protection. They are also the layer with the highest synthetic input. The right product depends on the animal, the region, and the household. The conversation to have with your vet.

| Type | Examples | Notes |
|---|---|---|
| Oral (isoxazolines) | Bravecto (12 weeks), NexGard (monthly), Simparica (monthly), Credelio (monthly) | Highly effective for dogs. Kill ticks after attachment, not before. Some are also labeled for cats; check with your vet. Generally well-tolerated. Rare neurological side effects (tremors, seizures) have been reported and are worth discussing with the vet, especially for dogs with seizure history. |
| Topical / spot-on | Frontline Plus, K9 Advantix II (dogs only), Revolution Plus | Applied to skin between the shoulder blades. Spread through skin oils. Useful for pets that will not reliably take oral medication. K9 Advantix contains permethrin (dog-only, toxic to cats). |
| Collar | Seresto | Continuous release. Lasts approximately 8 months. Some pets show local skin irritation; others find it the most convenient option. |

### Cats and permethrin: do not skip this

**Permethrin is acutely toxic to cats, often fatally so. Products labeled "for dogs only" frequently contain permethrin. Do not apply a dog product to a cat. Do not apply permethrin spray to bedding or carpets a cat will contact while still wet. Treat clothing in a cat-free area and let it dry fully (2 to 4 hours) before bringing it indoors.**

For cats, talk to your vet about feline-specific preventatives. Several oral and topical options are labeled and safe for cats; permethrin is not one of them.

## On the canine Lyme vaccine

A canine Lyme vaccine has been available for years. Vets in high-incidence regions often recommend it. Vets in low-incidence regions usually do not. Some integrative-oriented practices prefer to skip it in favor of titer monitoring; some conventional practices recommend it routinely. Questions worth bringing to your vet:

- What is local tick-borne disease incidence specifically? Is the vaccine standard of care here or a gray-area decision?
- Does my dog's other vaccine status, breed, and age background factor in?
- Are there alternative titer-based approaches to monitoring Lyme exposure without vaccination?
- What are the known side-effect rates in dogs similar to mine?

Different vets give different answers to all of these. Bring the questions, hear the reasoning, then make the call. That beats accepting a default recommendation without examining where it came from.

## Daily tick checks for pets

A preventative kills attached ticks but does not stop them from getting onto a coat. A natural supplement may or may not reduce attachments. Either way, a 60-second hand check after every outdoor session catches what the other layers leave and removes hitchhikers before they make it to indoor surfaces.

Run your hands slowly through the coat against the grain. Pay particular attention to:

- Inside and behind the ears
- Under the collar
- Armpits and the chest behind the front legs
- Groin and between the back legs
- Between toes and pads
- The base of the tail
- Around the eyes and mouth

A fine-toothed flea comb run across the back and flanks pulls off ticks that have not yet found a spot to attach. A TickMitt (a microfiber tick-catching glove, chemical-free, swiped over the coat) does the same job over a larger area in less time. Either tool reduces the chance that a loose tick survives the trip from yard to living-room rug.

*Commercial options: TickMitt microfiber tick-removal glove (go.tickguide.com/tickmitt); standard fine-toothed flea combs (various) (go.tickguide.com/flea-comb).*

◆ **PRINT THIS PAGE: PET TICK-CHECK ROUTINE**

## Pet Tick-Check Routine

*Run after every outdoor session in tick season. About 60 seconds per pet.*

**Daily preventative status**

- ☐ Current preventative active (vet-prescribed and/or natural blend)
- ☐ Next dose / replacement date logged: _____

**Post-outdoor check**

- ☐ Inside and behind both ears
- ☐ Under the collar (remove and check)
- ☐ Armpits and chest behind front legs
- ☐ Groin and inside back legs
- ☐ Between every toe and pad
- ☐ Base of tail
- ☐ Around eyes and mouth
- ☐ Flea comb across back and flanks

**If you find an attached tick**

- ☐ Remove with fine-tipped tweezers (Section 6: same protocol as for humans)
- ☐ Save the tick in tape or a sealed bag with the date
- ☐ Note the location on the pet
- ☐ Call your vet if your pet shows lameness, lethargy, fever, or appetite loss in the weeks following

**Date:** _____ **Pet:** _____ **Findings:** _____

# Section 6: If you get bitten

What you do in the first 72 hours after a bite matters more than anything that follows. The steps below, in order.

Finding an attached tick is uncomfortable. It is not, by itself, a medical emergency. Most tick bites do not transmit disease. Among those that do, prompt and correct removal followed by attentive follow-up dramatically improves outcomes. Read this section before you need it.

## Step 1. Remove the tick correctly

The CDC, the Infectious Diseases Society of America, and most integrative-medicine practitioners converge on a single removal protocol. It is boring, unsatisfying, and correct.

1. Use fine-tipped tweezers (not your fingers, not a tick key for a deeply embedded tick, not a credit card).
2. Grasp the tick as close to the skin surface as possible. Aim for the mouthparts, not the body.
3. Pull upward with steady, even pressure. Do not twist or jerk.
4. Continue pulling for several seconds. The cement plug the tick has secreted releases slowly.
5. Clean the bite site and your hands with soap and water (or, if available, witch hazel followed by water).

### What not to do

Several folk methods circulate and persist. None are supported by current evidence; several actively increase the risk of disease transmission by stressing the tick and triggering it to regurgitate stomach contents into the wound.

Do not apply: a hot match, a lit cigarette, petroleum jelly, nail polish, soap suds, alcohol, essential oils, or any other substance "to make the tick back out." Do not squeeze, crush, or twist the body of the tick. Do not handle the tick with bare fingers; pathogens can transfer through cuts and mucous membranes.

*Tools: Tweezerman Tick Tweezer (specifically designed for tick removal) (go.tickguide.com/tickease); Tick Key (use only for surface-attached ticks, not embedded) (go.tickguide.com/tick-key).*

## Step 2. Save the tick

The step almost everyone skips and almost everyone later wishes they had taken. Knowing what species bit you, how engorged it was, and roughly how long it was attached makes every subsequent decision easier.

- Place the tick on a piece of clear tape and fold it over. Or seal it in a small zip-top bag.
- Label with the date and the body location of the bite.
- Take a clear photo from above, with a coin or pen tip for scale.
- Keep it until at least 30 days past the bite. If symptoms develop, you have evidence.

Several university extension services (notably TickEncounter at the University of Rhode Island and TickSpotters) offer free or low-cost tick identification by photo. Several commercial labs offer PCR testing of the tick itself for major pathogens. Tick testing is not a substitute for clinical evaluation, but it can inform the conversation.

## Step 3. Estimate attachment time

For Lyme disease transmission specifically, attachment time matters significantly. The relevant pathogen (Borrelia burgdorferi) typically requires the tick to feed for 36 to 48 hours before transmission becomes likely. Other tick-borne pathogens transmit faster. Anaplasmosis and the Powassan virus can transfer in a matter of hours.

To estimate attachment time, look at the tick.

- Flat and unfed: probably attached less than 24 hours.
- Visibly swollen but still dark: roughly 24 to 48 hours.
- Grey, ballooned, large: 48+ hours.

This is approximate. When in doubt, assume longer rather than shorter, and treat the bite as a higher-risk event.

## Step 4. Decide whether and when to act

Two scenarios in the medical literature support taking action in the days immediately following a bite, not weeks later. Read both before deciding which (if either) applies.

### Scenario A: Pharmaceutical post-exposure prophylaxis

Published Infectious Diseases Society of America (IDSA) guidance describes a single oral dose of doxycycline, 200 mg for adults and 4.4 mg/kg up to 200 mg for children, as effective post-exposure prophylaxis for Lyme disease under all of the following conditions:

- The tick is identified or strongly suspected to be a blacklegged tick (Ixodes scapularis or pacificus).
- The tick was attached for 36 hours or more, based on engorgement.
- The dose can be started within 72 hours of tick removal.
- The bite occurred in an area where the local rate of B. burgdorferi infection in ticks is at least 20%.
- Doxycycline is not contraindicated for the patient. Current guidelines recommend the single-dose prophylaxis across age groups, including children; short courses are now considered appropriate, reversing older caution about young children. Pregnancy and breastfeeding remain reasons to ask about alternatives.

Call your physician promptly if those conditions plausibly fit. The 72-hour window is the operative one. Waiting for symptoms forfeits this option.

### Scenario B: Herbal post-exposure protocols (claimed)

Some integrative-medicine practitioners and herbalists, including Stephen Buhner (Healing Lyme), use herbal antimicrobial protocols as a post-bite preventative for patients who decline doxycycline. Core herbs in the Buhner protocol include Japanese knotweed (Polygonum cuspidatum), cat's claw (Uncaria tomentosa), andrographis (Andrographis paniculata), and astragalus. Bill Rawls's Vital Plan supplements occupy a similar category.

*Commercial options: Buhner Lyme Core Protocol kits and individual herbs from Green Dragon Botanicals and other suppliers (go.tickguide.com/buhner-protocol); Vital Plan Restore Kit (Rawls protocol) (go.tickguide.com/vital-plan); Stephen Buhner's books Healing Lyme and Healing Lyme Disease Coinfections (go.tickguide.com/buhner-books); Bill Rawls's book Unlocking Lyme (go.tickguide.com/rawls-book).*

What can be said about these protocols:

- There are no randomized clinical trials supporting any herbal protocol as a substitute for doxycycline in the acute post-exposure window. The evidence is anecdotal, mechanistic (the named herbs have documented in-vitro activity against Borrelia and related pathogens), and clinical-experience-based.

- Widespread use exists among integrative-Lyme practitioners and patients, particularly those who have had bad experiences with antibiotics or who already work with herbal-medicine practitioners.
- The decision to start a Buhner-style protocol instead of, or alongside, doxycycline is a decision a reader can make with their physician or integrative practitioner. The established protocol has clinical-trial backing the herbal protocol does not.

**Position on the herbal-alternative question**

This is not a recommendation to skip prophylactic doxycycline. It is a recognition that some people will choose differently and that the choice deserves accurate information rather than dismissal. The 72-hour window is the same regardless of which protocol you choose. Do not wait it out without a plan.

## Scenario C: Symptoms develop

Whether or not you took post-exposure prophylaxis of either kind, watch for symptoms in the 3 to 30 days following the bite.

- An expanding red rash at the bite site (the classic Lyme erythema migrans rash, present in approximately 70 to 80% of cases; its absence does not rule out infection).
- Fever, chills, or sweats.
- Severe fatigue out of proportion to recent activity.
- Headache, often severe.
- Muscle and joint aches, often shifting from one location to another.
- Swollen lymph nodes.

Any of these warrants a call to your physician, with the date of the bite, the species of tick if you saved it, and the estimated attachment time. For severe symptoms (high fever, confusion, severe headache, facial drooping, irregular heartbeat), escalate the same day.

◆ **PRINT THIS PAGE: TICK BITE DECISION FLOW**

## Tick Bite Decision Flow

*Put this on the fridge.*

**Right now (minutes)**

☐ Fine-tipped tweezers. Grasp at skin. Steady upward pull. No twisting.

☐ Clean the bite site and your hands.

☐ Put the tick on clear tape or in a sealed bag. Date it. Photograph it.

**Today (next several hours)**

☐ Estimate attachment time from engorgement.

☐ Identify the tick species if possible (TickEncounter, TickSpotters, or county extension).

☐ Check your regional risk in Section 7.

**In the 72-hour window**

☐ If the tick was blacklegged, attached 36+ hours, and the bite was in a high-Lyme region: call your physician about pharmaceutical post-exposure prophylaxis (single 200 mg doxycycline), OR call an integrative practitioner about an herbal post-exposure protocol. Either way, decide inside the window.

**3 to 30 days after the bite, watch for**

☐ Expanding rash at bite site

☐ Fever, chills, sweats

☐ Disproportionate fatigue

☐ Severe headache

☐ Shifting joint or muscle pain

☐ Swollen lymph nodes

**Any of the above → call your physician with: date of bite, species if known, estimated attachment time.**

**Bite date:** _____ **Body location:** _____ **Tick species:** _____ **Est. attachment:** _____

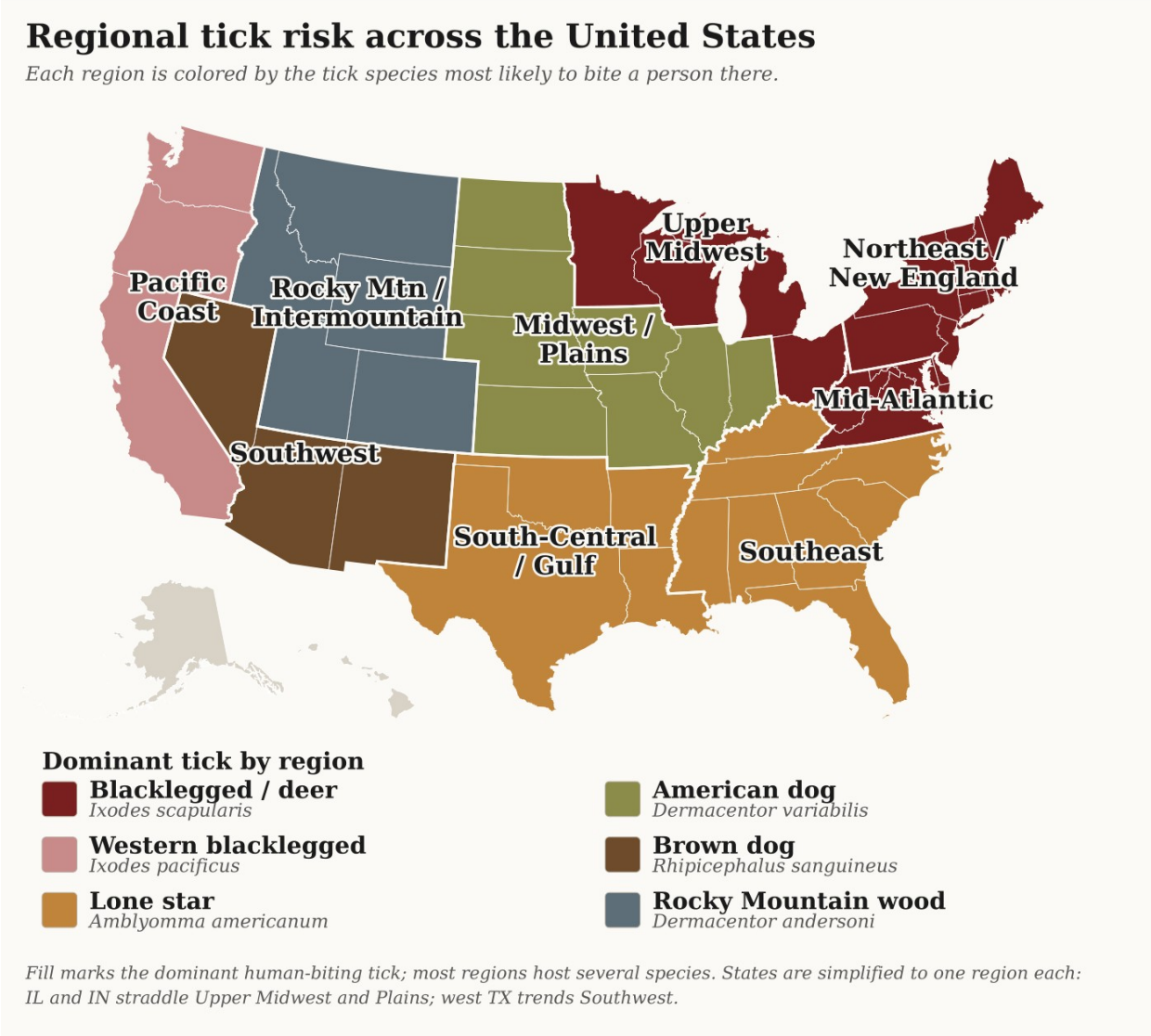
## If symptoms appear weeks or months later

Some tick-borne illnesses present with subtle, delayed, or atypical symptoms that do not map cleanly to the textbook acute-Lyme picture. Late-stage Lyme, chronic post-treatment Lyme symptoms, babesiosis, anaplasmosis, alpha-gal syndrome, and the southern variant STARI each have their own presentation and clinical workup. They can be missed, misattributed, and difficult to diagnose without a deliberate workup.

Walking a physician through a suspected tick-borne illness, which means knowing which tests to ask for, what counts as a meaningful result, how to advocate for yourself when a first test comes back negative, is the subject of the companion product to this one, the Post-Bite Emergency Protocol. If you are reading this in the middle of an evolving situation, that guide is the next step.

# Section 7: Regional risk reference

Tick-borne disease risk is dramatically regional. National averages mislead.




*Each region is shaded by the tick most likely to bite a person there. Built from US Census state geometry and CDC tick-distribution data.*

The same season, the same hike, the same dog mean very different exposure profiles depending on where you are standing. This section breaks the continental US into nine regions, names the tick species most likely to bite you in each, and lists the diseases that follow. The card at the end is the printable summary; the surrounding pages are the context.

Disease and tick ranges change. The blacklegged tick has expanded into states that recorded essentially zero Lyme cases two decades ago. The lone star tick has moved steadily north and west. Treat the regional notes below as a current best-available snapshot, not a permanent boundary.

## Northeast and New England

States: ME, NH, VT, MA, RI, CT, NY, NJ, PA. The single highest-incidence Lyme region in the world. Blacklegged ticks dominate; the same ticks transmit anaplasmosis, babesiosis, Borrelia miyamotoi, and the rare but severe Powassan virus. Lone star ticks have established populations in the southern parts of this region and are moving north. Tick activity is essentially year-round in mild winters, peaking May through July for nymphs and October for adults.

## Mid-Atlantic

States: DE, MD, VA, WV, DC. Mixed blacklegged and lone star tick territory. Lyme rates are very high. American dog tick contributes Rocky Mountain spotted fever cases. Alpha-gal syndrome reports have risen sharply as lone star populations consolidate north of historical ranges.

## Upper Midwest

States: MN, WI, MI, northern IL, northern IN, OH. The other Lyme hotspot, with rates rivaling or exceeding parts of the Northeast in some counties. Blacklegged tick dominates. Anaplasmosis and babesiosis follow the same vector. Powassan virus rare but documented.

## Southeast

States: NC, SC, GA, FL, AL, MS, TN, KY. Lone star tick is the dominant human-biting species. Ehrlichiosis is more common than Lyme disease in this region. STARI (Southern Tick-Associated Rash Illness) produces a rash that looks like Lyme but is caused by a different (and incompletely characterized) pathogen. Alpha-gal syndrome cases are heavily concentrated here. American dog tick also widespread.

## South-Central and Gulf

States: AR, LA, MS, AL, eastern TX, OK. Lone star dominant. Gulf Coast tick (Amblyomma maculatum) common, transmitting Rickettsia parkeri. American dog tick widespread. The brown dog tick is a notable indoor-infesting species across this region and can transmit Rocky Mountain spotted fever in specific local outbreaks.

## Midwest and Plains

States: IA, MO, KS, NE, SD, ND, southern IL, IN. Mixed picture. American dog tick widespread. Lone star moving north. Blacklegged tick established in pockets, especially in the eastern parts of the region. Rocky Mountain spotted fever cases concentrated in the "Tick Belt" of MO, AR, OK.

## Southwest

States: AZ, NM, southern NV, southern UT, west TX. The Southwest is sometimes treated as a low-tick region, which is partially correct and partially misleading. Lyme disease incidence is low. The dominant concern is the brown dog tick (Rhipicephalus sanguineus) in some Arizona communities, where outbreaks of severe Rocky Mountain spotted fever have been documented. The brown dog tick infests indoor spaces and is associated with dog populations, making it different from the wooded-edge species that dominate elsewhere. American dog tick and Rocky Mountain wood tick also present at higher elevations.

## Rocky Mountain and Intermountain West

States: MT, WY, ID, UT, CO. Rocky Mountain wood tick is the headline species at higher elevations, transmitting Rocky Mountain spotted fever, Colorado tick fever, and tularemia. American dog tick at lower elevations. Lyme disease rare but not absent.

## Pacific Coast

States: CA, OR, WA. Western blacklegged tick is the Lyme vector here, but exposure is far lower than in the Northeast. Only a small percentage of nymphs typically carry B. burgdorferi, in part because the dominant reservoir host (the western fence lizard) does not support the bacterium. Pacific Coast tick (Dermacentor occidentalis) common; transmits Pacific Coast tick fever. Tick activity skews to cool wet months rather than midsummer.

◆ **PRINT THIS PAGE: REGIONAL RISK REFERENCE CARD**

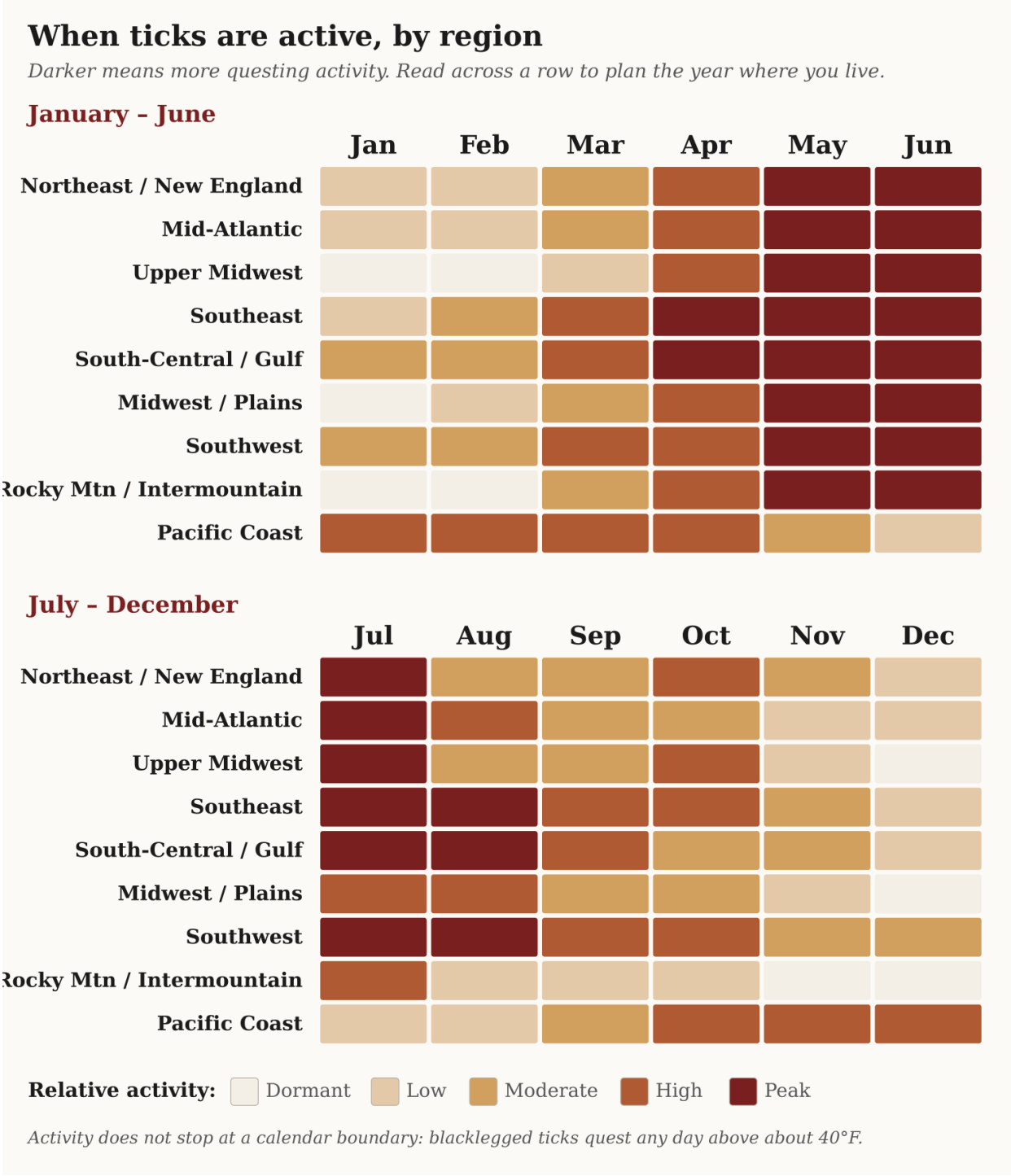
## Regional Risk Reference Card

*Glove compartment. Backpack. Inside the front cover of the field journal.*

| Region | Dominant ticks | Key diseases | Peak risk window |
|---|---|---|---|
| Northeast / New England | Blacklegged, lone star (southern), American dog | Lyme, anaplasmosis, babesiosis, Powassan | May–Jul nymphs; Oct adults |
| Mid-Atlantic | Blacklegged, lone star, American dog | Lyme, ehrlichiosis, RMSF, alpha-gal | Apr–Aug |
| Upper Midwest | Blacklegged, American dog | Lyme, anaplasmosis, babesiosis, Powassan | May–Jul nymphs; Oct adults |
| Southeast | Lone star, American dog | Ehrlichiosis, STARI, alpha-gal, RMSF | Apr–Aug |
| South-Central / Gulf | Lone star, Gulf Coast, American dog, brown dog | Ehrlichiosis, alpha-gal, RMSF, R. parkeri | Mar–Sep |
| Midwest / Plains | American dog, lone star, blacklegged (pockets) | RMSF, ehrlichiosis, Lyme (regional) | Apr–Aug |
| Southwest | Brown dog (especially AZ), American dog, Rocky Mountain wood | RMSF, Colorado tick fever, tularemia; low Lyme | Mar–Sep |
| Rocky Mountain | Rocky Mountain wood, American dog | RMSF, Colorado tick fever, tularemia | Mar–Jul |
| Pacific Coast | Western blacklegged, Pacific Coast | Lyme (low rate), anaplasmosis, Pacific Coast tick fever | Cool wet months |

*Starting point only. Confirm with your county or state public-health department for current local hotspots. Many states publish weekly tick activity updates during peak season.*

## Tick activity through the year, by region




*Relative questing activity by region across the year, derived from the peak-risk windows in the card above. A planning aid, not a hard boundary.*

# Common myths, briefly debunked

Things you have heard at the trailhead, on the playground, or from your father-in-law.

Tick advice survives long after it stops being correct. The list below addresses the recurring claims most likely to cause harm or waste effort. Each is short on purpose.

### "Ticks drop from trees."

They do not. Ticks quest from the tips of grass and low vegetation, usually below 3 feet. The tick on your scalp climbed there from your sock or your shoulder.

### "If there is no bullseye rash, it is not Lyme."

The erythema migrans rash appears in roughly 70 to 80% of confirmed Lyme cases. That leaves a meaningful share of patients with no rash at all, or with a rash that does not look like a bullseye. The absence of a rash does not rule out infection.

### "A hot match / nail polish / Vaseline will make the tick back out."

It will not. What it does is stress the tick, which increases the chance of regurgitation of stomach contents into the wound. Exactly the mechanism for pathogen transfer. Fine-tipped tweezers and steady upward pressure. That is it.

### "I checked myself, I am fine."

A casual visual check misses nymphs by definition. They are the size of a poppy seed and preferentially attach in places you cannot see without help. A proper check involves running fingers slowly across every region listed in Section 4.

### "The dryer kills ticks if I wash on hot first."

Backward. Heat kills ticks; water alone does not, even hot. Outdoor clothes go in the dryer first (high heat, ten minutes minimum) and then into the washer if you choose. The dryer is the kill step.

### "Lyme disease is not really a problem in my state."

Maybe true ten years ago. Tick ranges and disease incidence have moved substantially in the last two decades. Check Section 7 and your state public-health surveillance reports for current data, not folk knowledge from when you were a kid.

### "Garlic or B vitamins repel ticks from the inside out."

The evidence base is real but limited. Garlic shows some lab-bench tick-deterrent effects via sweat chemistry change. Brewer's yeast in animal studies has shown modest flea-repellent effects. B1 (thiamine) has been tested for mosquitoes with consistent negative results; tick-

specific testing is essentially absent. Use them in a supplemental role, not as a primary defense. See Section 4 for the longer treatment.

### "Tick-borne disease is only a problem if the tick stays attached a long time."

Mostly true for Lyme disease specifically (about 36-hour minimum for likely transmission). Several other pathogens transmit faster. Powassan virus transmission has been documented within 15 minutes of attachment. Do not use a short attachment time as a reason to ignore a bite.

# Frequently asked questions

Compiled from the questions buyers of this guide actually ask.

### Is one type of repellent "best"?

Among EPA-registered options, 20% picaridin and 25 to 30% DEET perform comparably against ticks in head-to-head field studies. OLE/PMD at 30% is the strongest plant-derived option. The right pick is the one you will consistently apply. Most people who hate the feel of DEET stay compliant with picaridin or OLE and end up better protected as a result.

### Do I really need to treat clothes with permethrin if I am already using a skin repellent?

They do different jobs and the two together is the most effective combination in the field. Skin repellent makes it harder for ticks to bite skin; permethrin kills ticks that contact treated clothing before they reach skin. In high-exposure situations (children playing in tall grass, hunters, hikers in known Lyme areas), both layers earn their place. For households declining permethrin, cedar oil clothing spray is a shorter-duration alternative.

### How young is too young for OLE, picaridin, or DEET?

Per current CDC and EPA guidance: DEET is generally accepted for children over 2 months at appropriate concentrations. Picaridin and IR3535 follow similar age guidance. OLE/PMD is not recommended for children under 3. Confirm with your pediatrician for infants and follow product labels.

### Can I get Lyme disease from my dog?

Not directly. Dogs do not transmit Lyme disease to humans through contact. They can carry live ticks indoors that subsequently attach to humans. That indirect route is the main reason pet protection is included in this guide.

### If I find a tick on my body but it is not attached, what should I do?

Confirm it is actually unattached (gently nudge; an attached tick will not move freely). Remove it. Dispose of it in a sealed bag. An unattached tick that has not fed cannot have transmitted a pathogen. Take it as a signal to scrutinize the rest of the body and clothing more carefully. Where there is one, there are often more.

### Are tick-borne diseases a one-time risk, or can I get Lyme again?

Reinfection is possible. Prior infection with Borrelia burgdorferi does not produce reliable immunity. People in high-incidence areas have been documented with two, three, or more discrete Lyme infections over the course of years. Prevention remains the right strategy regardless of medical history.

## Is there a Lyme vaccine?

A canine Lyme vaccine has been available for years and is offered routinely by veterinarians in high-incidence regions (see Section 5 for the conversation to have with your vet). A human Lyme vaccine is in late-stage clinical trials as of this guide's edition. None is yet approved for general public use in the US. Note that an earlier human Lyme vaccine, LYMErix, was approved in 1998 and pulled from the market in 2002, primarily because of poor sales but also after reports of side effects that were investigated and largely (though not entirely) dismissed. That history is worth knowing if you are deciding what to do with the next one.

## My doctor said the Lyme test was negative. Am I in the clear?

Maybe. The standard two-tier serology has limited sensitivity in the first several weeks after infection, when antibodies have not yet developed to detectable levels. A negative test in the acute window does not rule out infection. This is the situation the Post-Bite Emergency Protocol covers in detail.

## Can I treat my yard organically and still see results?

Yes, with caveats. Habitat reduction, barrier zone, and host management are not chemical interventions and do the heavy lifting. Replacing synthetic acaricide with cedar oil or essential-oil blends will likely reduce knockdown duration, so plan on more frequent reapplication and a more aggressive habitat-and-predator program (see the beneficial-wildlife section in Section 3).

## How long does permethrin treatment on clothing actually last?

Factory-treated clothing (Insect Shield and similar): approximately 70 washes, typically the practical life of the garment. DIY 0.5% spray: approximately 6 weeks or 6 washes, whichever comes first. Re-treat at the start of each tick season.

## Do I need to worry about ticks in winter?

Less, but not zero. Adult blacklegged ticks become active any day above approximately 40°F, including warm spells in January or February. Pet preventative regimens are now generally recommended year-round in most of the country for this reason.

## Are tick tubes (the cardboard ones with treated cotton) safe?

Reasonably safe in the way they are designed to be used. The permethrin is concentrated inside the cotton; mice carry small amounts back to nests; exposure to other wildlife is minimal. Households deeply opposed to permethrin use anywhere on the property skip them. Households comfortable with targeted application accept them as one of the most effective interventions for actually breaking the Lyme transmission cycle on a property.

# What to do next

Three things, in order.

## 1. Print the tools

Six pages, six places. Risk audit on the desk. Yard checklist in the garage. Prep card on the door. Pet routine in the leash drawer. Decision flow on the fridge. Regional card in the glove compartment. The guide is the explanation. The tools are what actually changes behavior.

## 2. Walk the property this weekend

Section 3 is the single biggest intervention available to most households. Habitat first, barrier zone second, host management and predator-friendly setup third, chemicals last and only if you choose them. None requires equipment you cannot source at a hardware store in a single Saturday.

## 3. Decide whether you want the companion guides

This guide covers prevention. Two companion products in the same series cover what comes after.

- The Post-Bite Emergency Protocol picks up where Section 6 leaves off: how to advocate for proper testing, what to ask for in the first physician visit, what to do when the first round of tests comes back negative, how to track symptoms in a format a clinician will actually use, and how integrative and conventional approaches sequence together when both are on the table. (go.tickguide.com/post-bite)
- The Alpha-Gal Survival Guide is a dedicated reference for anyone diagnosed with or suspecting alpha-gal syndrome (the meat allergy mediated by lone star tick bites), including the hidden-source food and medication lists that make day-to-day life with the condition manageable. (go.tickguide.com/alpha-gal)

# Sources

Where the "established" claims in this guide come from. Where the "claimed" ones come from.

The clinical, public-health, regulatory, and entomological content in this guide draws from the following sources.

## Public-health and regulatory

- US Centers for Disease Control and Prevention. Ticks division materials, including guidance on tick removal, tick-safe yards, repellent selection, and surveillance data by region.
- US Environmental Protection Agency. Registered repellent active ingredients (DEET, picaridin, IR3535, OLE/PMD, 2-undecanone) and minimum-risk pesticide guidance under FIFRA 25(b).
- Infectious Diseases Society of America (IDSA). Clinical practice guidelines on Lyme disease prevention, diagnosis, and treatment, including post-exposure prophylaxis criteria.
- State and county public-health surveillance reports for regional incidence rates and tick activity calendars.

## Academic and research-program sources

- University of Rhode Island TickEncounter Resource Center (tickencounter.org).
- Cary Institute of Ecosystem Studies. Keesing, Ostfeld, and colleagues on opossum tick consumption and Lyme ecology.
- Cornell University Northeast Regional Center for Excellence in Vector-Borne Diseases.
- Yale School of Public Health Tick-Borne Diseases program.
- Levi, T., et al. 2012. "Deer, predators, and the emergence of Lyme disease." PNAS. Used for fox/predator connection to Lyme incidence.
- Peer-reviewed entomology and infectious-disease journals: Journal of Medical Entomology, Vector-Borne and Zoonotic Diseases, Emerging Infectious Diseases, Ticks and Tick-Borne Diseases.

## Integrative-medicine sources

- Stephen Harrod Buhner, Healing Lyme: Natural Healing of Lyme Borreliosis and the Coinfections Chlamydia and Spotted Fever Rickettsioses, 2nd edition.
- Bill Rawls, MD. Unlocking Lyme and the Vital Plan integrative protocols (vitalplan.com).

- HHS Tick-Borne Disease Working Group reports to Congress (2018, 2020, 2022). For the documented gaps in conventional Lyme research and diagnosis.

# Recommended products and tools

A consolidated buyer's reference. Everything mentioned by brand name in the body, organized by where it fits in the stack.

Affiliate placeholders are noted in brackets. Where the recommendation depends on the situation, the body of the guide says so; this list is the shopping companion, not the decision-making one.

## Skin repellents

### Plant-derived (lowest body absorption)

- Repel Lemon Eucalyptus, 30% OLE/PMD. The CDC-affirmed plant-derived option. (go.tickguide.com/repel-ole)
- Murphy's Naturals Lemon Eucalyptus Insect Repellent Spray. (go.tickguide.com/murphys-ole)
- Cutter Lemon Eucalyptus. (go.tickguide.com/cutter-ole)
- All-Terrain Herbal Armor. Plant-oil blend, short duration, low-pressure outings. (go.tickguide.com/all-terrain)
- Babyganics. Mild plant-blend formulation for short-duration use. (go.tickguide.com/babyganics)
- Badger Bug Spray. Plant-oil formulation for short-duration use. (go.tickguide.com/burts-bees)

### Synthetic, lower-absorption alternative

- Sawyer Premium Insect Repellent, 20% picaridin. Strong efficacy, no measurable skin penetration. (go.tickguide.com/sawyer-picaridin)
- Ben's Tick Repellent Eco-Spray, picaridin. (go.tickguide.com/bens-picaridin)
- Natrapel Tick & Insect Repellent, picaridin. (go.tickguide.com/natrapel)
- Ranger Ready Picaridin. (go.tickguide.com/ranger-ready)

### DEET: situational use only

- OFF! Deep Woods, 25% DEET. (go.tickguide.com/off-deep-woods)
- Ben's 30% DEET Tick & Insect Repellent. (go.tickguide.com/ultrathon)

- Repel Sportsmen Max, 40% DEET. (go.tickguide.com/repel-sportsmen-max)

## Clothing and gear treatment

- Sawyer Permethrin Insect Repellent for Clothing, 0.5%. DIY spray, ~6 weeks per treatment. (go.tickguide.com/sawyer-permethrin)
- Ben's Clothing & Gear Insect Repellent. Permethrin DIY equivalent. (go.tickguide.com/permanone)
- Insect Shield treated clothing. Factory-bonded permethrin, ~70 washes. (go.tickguide.com/insect-shield)
- ExOfficio BugsAway line. Factory-treated outdoor apparel. (go.tickguide.com/exofficio-bugsaway)
- Cedar oil clothing alternative: Cedarcide Tactical Spray (go.tickguide.com/cedarcide-tactical) or Wondercide Outdoor Spray (go.tickguide.com/wondercide-yard). Shorter duration, no permethrin.

## Tick removal and detection tools

- Tweezerman Tick Tweezer. Fine-tipped, designed for tick removal. (go.tickguide.com/tickease)
- Tick Key. Surface-attached tick removal. Not for embedded ticks. (go.tickguide.com/tick-key)
- TickMitt microfiber glove. Sweeps loose ticks off skin, clothes, pet fur before they embed. Chemical-free. (go.tickguide.com/tickmitt)
- Fine-toothed flea comb. Pulls loose ticks off pet coats. (go.tickguide.com/flea-comb)

## Yard products

- Thermacell Tick Control Tubes. Permethrin-treated cotton in cardboard tubes; targets the larval-tick / mouse cycle. (go.tickguide.com/thermacell-tick-tubes)
- Cedarcide Tactical. Cedar-oil yard treatment. (go.tickguide.com/cedarcide-tactical)
- Wondercide Yard Spray. Cedar-and-essential-oil yard treatment. (go.tickguide.com/wondercide-yard)
- Mosquito Barrier or Garlic Barrier. Garlic-sulfur yard spray. (go.tickguide.com/garlic-barrier)
- Beneficial nematodes (Steinernema, Heterorhabditis). Soil organisms that parasitize tick larvae. (go.tickguide.com/nematodes)

## Pet supplements (claimed)

- Only Natural Pet Brewer's Yeast & Garlic Chews. (go.tickguide.com/onlynaturalpet-bg)
- NaturVet Brewer's Yeast with Garlic. (go.tickguide.com/naturvet-bg)
- Vet's Best Brewer's Yeast & Garlic Chews. (go.tickguide.com/vets-best-bg)
- PetHonesty Flea & Tick Defense Chews. (go.tickguide.com/pethonesty-ft)

## Pet topicals (natural)

- Wondercide Flea & Tick Spray for Pets. Cedar-oil-based. (go.tickguide.com/wondercide-pet)
- Vet's Best Flea & Tick Spray. Plant-oil blend. (go.tickguide.com/vets-best-spray)
- Cedarcide Tickshield. Cedar-oil pet topical. (go.tickguide.com/cedarcide-tickshield)
- Earth Animal Nature's Protection. Herbal-blend pet repellent. (go.tickguide.com/earth-animal)

## Pet preventatives: vet prescription

These require a veterinarian. No direct-affiliate path. Discussed with your vet using the questions in Section 5.

- Oral isoxazolines: Bravecto (12 weeks), NexGard, Simparica, Credelio (monthly).
- Topical / spot-on: Frontline Plus, K9 Advantix II (dogs only), Revolution Plus.
- Collar: Seresto (~8 months).

## Post-bite herbal protocols (claimed)

For readers exploring Scenario B in Section 6. Affiliate programs to investigate as they become available.

- Buhner Lyme Core Protocol kits and individual herbs (Japanese knotweed, cat's claw, andrographis, astragalus). Sold by Green Dragon Botanicals and other herbal-medicine suppliers. (go.tickguide.com/buhner-protocol)
- Vital Plan Restore Kit and Restore Lyme Protocol. Bill Rawls's formulation. (go.tickguide.com/vital-plan)
- Stephen Buhner, Healing Lyme (book). (go.tickguide.com/buhner-books)
- Stephen Buhner, Healing Lyme Disease Coinfections (book). (go.tickguide.com/buhner-books)
- Bill Rawls, Unlocking Lyme (book). (go.tickguide.com/rawls-book)

## Companion guides in this series

- Post-Bite Emergency Protocol. What to do after the 72-hour window: testing, advocacy, symptom tracking, integrative and conventional protocols. (go.tickguide.com/post-bite)
- Alpha-Gal Survival Guide. Living with the lone-star-tick-induced meat allergy. (go.tickguide.com/alpha-gal)

# Disclaimer

This guide provides educational information about tick prevention, identification, removal, and the public-health and integrative-medicine approaches currently in use for tick-borne illness. It is not medical advice. It does not diagnose, treat, cure, or prevent any disease.

No part of this guide should be substituted for evaluation, advice, diagnosis, or treatment by a licensed healthcare professional. Decisions about your health, your pet's health, and the use of repellents, acaricides, supplements, herbal protocols, or prescription medications are decisions for you in consultation with your physician, your veterinarian, your integrative practitioner, or your applicator. They are not decisions this guide makes for you.

The author and publisher make no warranty, express or implied, regarding the completeness, accuracy, or fitness of the information for any particular purpose. Tick distribution, disease incidence, regulatory status of pesticide and repellent products, herbal-medicine practice, and clinical guidelines all change over time. Readers are responsible for confirming current information against authoritative sources before acting.

The mention of any commercial product is not an endorsement and not a claim of efficacy beyond what the relevant regulatory body (EPA, FDA, or analogous) has reviewed. Products mentioned by brand name are mentioned because they are widely recognized examples of their category. Affiliate relationships, where applicable, are disclosed at the point of link.

Use of this guide constitutes acknowledgement of the above and of the principle that personal-health and household decisions remain the responsibility of the reader.